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ABSTRACT

Intended for driver education instructors in Ohio, the guide is designed to acquaint teachers with special characteristics, capacities, and needs of the handicapped student population and to provide resources, information, and ideas for meeting those special needs. An introductory section discusses the purpose and use of the curriculum. Section 2 offers code excerpts and explanations of pertinent legislation including Ohio's Revised Code (ORC) 3301.17, Rule 3301-81-01, P.L. 93-513 (Section 504), P.L. 94-142 (the Education for All Handicapped Children Act), ORC 4503.105, ORC 4511.69, ORC 4507.08, ORC 4507.14, and ORC 4507.161. Section 3, titled "Assessment," deals with measures for determining readiness for driver education (sample forms are included). Discussed in Section 4 are the characteristics of mildly mentally handicapped learners, and what to do about them, additional classroom strategies, and scheduling approaches (including advantages and disadvantages of each). Section 5 suggests approaches to teaching the visually and hearing impaired, while Section 6 addresses physical handicaps. Section 7 briefly describes the procedures necessary for handicapped students to obtain a driver's license. A final section of appendixes contains a bibliography, a list of audiovisual materials for the instructor, and a list of manufacturers of adaptive controls. (SBH)

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NATIONAL INSTITUTE OF EDUCATION

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DRIVER EDUCATION CURRICULUM GUIDE

Ohio Department of Education
Division of School Finance
Driver Education Section

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FOREWORD

Highway traffic safety education has been a vital concern of the American people since the development of powered vehicles to transport persons and materials. The Traffic and Motor Vehicle Act and the Highway Safety Act of 1966 were landmarks in establishing the role of government in instituting education programs designed to reduce the number of injuries and deaths on our highways.

The State Board of Education has long recognized the importance of responsible, cogent education for those individuals entering our highly complex transportation system. The Ohio Department of Education, Division of School Finance, Driver Education Section, has the primary responsibility of administering a state subsidy for all approved driver education programs meeting state minimum standards and, through the use of funds provided by the National Highway Traffic Safety Administration, intensifying the effectiveness of the traffic safety education effort.

Among those for whom quality driver education is extremely important are the handicapped —those who have mental, visual, hearing, or physical disabilities which can cause them to have special education needs. Administrators and teaching staffs must be adequately prepared to meet these needs.

The purpose of this guide is to help the driver education instructor prepare to teach handicapped students who enter the driver education program. On the assumption that driver education goals and outcomes for the handicapped are essentially the same as for nonhandicapped students, this guide focuses on (1) acquainting the instructor with special characteristics, capacities, and needs of the handicapped student population and (2) providing resources, information, and ideas for meeting those special needs. The ultimate goal is to help handicapped students, like their nonhandicapped counterparts, to become safe, responsible drivers.

Franklin B. Walter

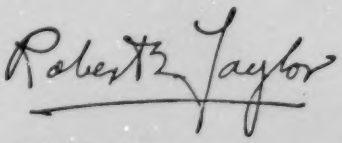
Franklin B. Walter
Superintendent of Public Instruction

PREFACE

The Ohio Traffic Safety Education Center (OTSEC), a project of the National Center for Research in Vocational Education at The Ohio State University, is funded by the Ohio Department of Education, Division of School Finance, Driver Education Section. OTSEC was organized to provide assistance to the citizens and state departments of Ohio in five basic functional areas: research, development, services, education, and dissemination. These areas to a large extent parallel the functional areas of the National Center.

Within the five areas, driver and traffic safety education projects at OTSEC have been broad in scope. They have included such activities as developing driver education curricula for use in public schools, publishing a traffic safety newsletter for distribution throughout the state, developing a driver education information booklet for local school boards, compiling technical research papers, organizing and operating a driver and traffic safety information center, conducting workshops in motorcycle safety and driver education for the handicapped, and many others.

The outcome of OTSEC's research, development, and education programs has been heightened awareness of driver and traffic safety practices on the part of Ohio's citizens. By furthering this awareness, OTSEC has made and will continue to make a positive impact on traffic safety in Ohio.



Robert E. Taylor
Executive Director
The National Center for
Research in Vocational Education

ACKNOWLEDGMENTS

The staff of the Division of School Finance, Driver Education Section, express genuine appreciation to the participants in the Advanced Driver Education Workshop at Miami University.

This advanced workshop in special education instruction, sponsored by the Ohio Department of Education with funds made available by the National Highway Traffic Safety Administration, studied the design and selection of performance objectives, human factors (learning, perception, risk acceptance, information processing, vision, motivation), current adaptive driving procedures research, existing instruction units in the United States and Europe, and cost effective traffic safety countermeasures.

At the culmination of this workshop, the following Ohio school teachers and supervisors wrote the first draft of this guide under the direction of Dr. Robert Shrader.

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The Driver Education Section and the Ohio Traffic Safety Education Center acknowledge the expertise and assistance of Ohio educators in the following contributions to this guide:

Field-testing: Mario Piastrelli and Ron Tvorik, Parma City Schools; Robert Sheehan, Northridge Local Schools, Dayton.

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In addition, appreciation is expressed to those students who took part in the field-test programs.

. . . . . .

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developing
careful young drivers
through education

Ohio Department of Education

PURPOSE

Broadly speaking, the purpose of this curriculum guide is to help the instructor provide driver education to handicapped students. It may be used with one or more handicapped students included in a class of nonhandicapped students, with a small, specialized class composed of only handicapped students, or with handicapped students taught on an individual basis.

This guide differs from other driver education guides in that no course sequence or learning objectives are included. Essentially, the knowledge and skills necessary for a person to drive do not vary with respect to handicaps. Ultimately the nonhandicapped student and the handicapped student will have to pass the same tests in order to obtain a driver's license and will have to operate the same vehicles on the same roads with equal competence. Therefore, a curriculum for use with the handicapped should contain the same objectives as the regular driver education curriculum.

This guide, then, is designed to be used in conjunction with the existing driver education curriculum. In this respect, it might more properly be called a curriculum supplement. The objectives of this supplement are the following:

- to develop awareness of handicapped student populations — their needs, capacities, characteristics, and diversity;
- to develop awareness of education's responsibility with respect to driver education for handicapped students;
- to provide information about techniques for teaching handicapped students in the driver education class; and
- to provide resources for obtaining additional information.

The emphasis throughout this guide is on the effects of the various handicaps on learning to be a safe driver.

The Handicapped Student Population

The population of handicapped students that the driver education instructor is likely to encounter is quite diverse. They may have disabilities affecting any aspect of their physical functioning, learning ability, judgmental and decision-making skills, visual and hearing acuity, or other abilities and characteristics. Each disability will have different implications for learning safe driving skills. Furthermore, disabilities may occur in any combination and thus create an almost infinite variety of instructional needs. It is very difficult to make any general statements that will apply to all handicapping conditions.

To render the special education population subject somewhat more manageable for discussion, the handicapping conditions in this guide are divided into three major groups:

1. mild mental handicaps,
2. sensory handicaps (visual and hearing impairments), and
3. physical handicaps.

Sections 4, 5, and 6 of this guide are devoted to these groups. These sections include information about the handicapping conditions, characteristics that might accompany those conditions, special instructional needs, and recommended instructional strategies.

Even within these groups, however, there is a great deal of diversity. Although some general statements are made in this guide with regard to groups with handicapping conditions, the instructor is cautioned to avoid making generalizations or forming preconceptions about an individual based on the presence of a particular handicap. Handicapped individuals are constantly proving such preconceptions wrong. There is a tremendous capacity among handicapped individuals which, if understood and utilized by the student and the instructor, can enable them to succeed at many personal, educational, and professional endeavors — including driving a car. Robert W. Gutshall described the situation of the handicapped student in this manner:

> A student with a handicap is primarily a student. His [or her] particular difficulty, as with most other obstacles, can be overcome in the majority of cases by teaching aids, some extra effort on the teacher's part, and most of all, by giving him [or her] a "chance."[1]

[1] "The Handicapped Student . . . and the Automobile," *Traffic Safety*, January 1962, pp. 15-16.

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The Challenge

The Instructor's Attitude

It is true that not everyone may become a safe driver (Section 3 of this guide, "Assessment," deals with determining readiness for driver education); but many (if not most) handicapped individuals who will be referred to the driver education program can become effective drivers. A positive attitude on the part of the instructor is one of the most crucial factors in making success possible. The instructor must be positive, open, encouraging, and confident that success is possible. The instructor must also realize that his or her own involvement can be almost as enabling or as limiting for the student's potential success as the student's own characteristics.

The instructor's attitude shows most clearly, of course, in the way he or she acts in the company of a handicapped student. The following suggestions for interaction with handicapped students are provided for those instructors who have had little or no experience with handicapped students and who would welcome some guidance in this area. Adapted from the pamphlet "When You Meet a Handicapped Person" distributed by the Easter Seal Society for Crippled Children and Adults, these suggestions focus on the physically handicapped person; however, with a little common sense one can infer from them what might be appropriate for individuals with other handicaps. It should be remembered, however, that people with handicaps are not alike and do not necessarily want to be treated alike. As with any other group of students, what is comfortable for one person is not necessarily comfortable for another. So treat these simply as suggestions for interaction and take your cues from the individual you are with.

1. Remember that the person with a handicap is a person. He or she is not like anyone else, except for the special limitations of the handicap.

2. If possible, observe your students in other classes or activities before you meet with them. Simply knowing what to expect can help reduce anxiety or awkwardness on your part. Very often, this kind of observation will demonstrate that your interaction with them will be much the same as with other students.

3. Be yourself when you meet handicapped students; talk about the same things as you would with any other student. Show friendly interest in the student as an individual just as you would with any other student.

4. Don't be overprotective or oversolicitous. Don't shower the handicapped student with extraordinary kindness. Don't offer pity or charity. Handicapped students should be treated like other students and be given a chance to prove themselves.

5. Don't be afraid to laugh with handicapped students or to enjoy your relationship with them. A nonhandicapped person who has the opportunity to share the philosophy and good humor of a handicapped person can benefit greatly from this association.

6. To the extent that you need to discuss the student's disability in order to assess its potential impact upon the driving task, do so in an objective manner. Ask only questions that are pertinent. Don't ask embarrassing questions out of curiosity. If students want to tell you more about their disabilities, they will bring up the subject.

7. Be patient. Let the handicapped person set the pace in walking, talking, getting into and out of the car, and performing other tasks. Don't be too quick to help; see what the students can do on their own. If you think the student needs help, offer assistance; find out from the student how you can be most helpful.

8. Don't separate a physically disabled student from wheelchair or crutches unnecessarily. The individual may want them within reach. (In the training car with the instructor present, these aids will have to be placed in the back seat or trunk.)

9. Don't make up your mind ahead of time about the handicapped student. You may be surprised at how wrong you are in judging the person's interests and abilities.

Sections 4, 5, and 6 of this guide provide additional and more specific information about the handicapped student population.

Education's Responsibility

The legal mandates are clear regarding the rights of the handicapped to all forms of education, including driver education, and to equal access to employment (see Section 2 of this guide, "The Law"). There is still a great need, however, for each person in the educational field to recognize and accept an individual role in providing quality education to handicapped students.

Certainly, the need of handicapped persons for driver education is tremendous. In our mobile society, personal, social, and employment access depend to a great extent on physical mobility — the ability to get there from here. The ability to drive is one of the most crucial factors in a handicapped person's being able to develop an independent lifestyle. Instructors need only imagine the impact on their own lives of total dependence on others for mobility to realize the importance of driving for handicapped individuals.

Many handicapped people, in fact, may learn to drive and obtain driver's licenses whether or not they have had the benefit of driver education. It is up to the field of driver education to help handicapped students become safe, responsible drivers by providing them an opportunity to obtain quality instruction.

Meeting the Challenge

Techniques

Because of the diversity within the handicapped population, no universal teaching strategies exist that are equally effective with all handicapped students. As with nonhandicapped students, each handicapped individual is different; the instructor must regard each student as an individual who happens to have one or more handicapping conditions that have some impact upon instructional needs.

There are, however, many techniques the instructor can employ to help individuals with handicapping conditions learn to become responsible drivers. Sections 4, 5, and 6 of this guide outline many such techniques.

A general instructional approach that has merit with any student group — and especially with handicapped students — is described below. Most instructors naturally employ these elements in some form in their teaching. Simply giving more conscious attention to them can be of great benefit to the driver education program that includes handicapped students.

Assess — Assessment refers not only to the pre-driving assessment through which a determination is made of the student's readiness for driver education; it refers also to the assessment that should occur on a continuing basis during instruction. It is especially important for handicapped students that an assessment be made of where the students are in the development of a concept or skill before instruction in that concept or skill begins. This assessment might take such a simple form as asking students whether they have tried a particular maneuver before or asking students to demonstrate what they can do with a given task. In some cases, the assessment might be more elaborate. The outcome of the assessment will tell the instructor whether some pre-instruction is needed or whether some parts of the lesson might be covered more quickly.

Plan — Based on the assessment (both pre-instruction and during-instruction assessment), planning might range from a simple step of deciding how to approach a task to a sequence of learning objectives to be undertaken on the basis of identified disabilities. Task analysis is valuable here in determining what the tasks are that constitute some portion of the learning, what tasks have already been mastered, and what tasks remain to be mastered by the student.

Implement — The next step is to put into effect the instruction that was planned. This needs little explanation except perhaps a reminder that flexibility will be quite important when working with a handicapped student. Overestimates or underestimates of the student's capacity or need for instruction in a given skill might necessitate a reassessment of the situation.

Evaluate — Evaluation of the student's progress will take place both formally and informally. For example, when teaching a task the instructor will make a judgment about the student's mastery of the task before proceeding to the next task. This is a simple form of evaluation. With regard to more formalized evaluation, there are suggestions in Sections 4, 5, and 6 for adaptations that might be made for the various groups. Students should be informed of their progress at all times.

Using This Guide

The instructor is advised to become familiar with the entire guide before attempting to use the suggested strategies with students. A basic familiarity with the handicapped student population as a whole will be helpful in working comfortably with the student who has special needs. Furthermore, because of the diversity of handicaps and because of the frequent overlaps among groups, the instructor may find that suggestions given for working with one type of handicap will work equally well with another handicap.

Finally, it should be recognized that quite often strategies that are effective with handicapped students can be equally effective with nonhandicapped students. In most cases, the instructor who has only one or a few handicapped students within a nonhandicapped class need not teach the students in different ways. Rather, the challenge usually is to find a way to adapt the instructional technique so that everyone benefits from the adaptation.

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Introduction

Recent legislative developments have provided the field of education — including driver education — with the challenge of developing more adequate educational services for handicapped learners. The extent to which this challenge is met will depend in large measure on the instructor's knowledge and skill. In order to meet this challenge adequately, the instructor should be aware of how current legislation affects driver education programs.

The purpose of this section of the guide is to develop an awareness of the legal responsibility of driver education to handicapped students. The following are brief summaries of federal and state legislation which affect the education, examination, and licensure of handicapped drivers. For additional information on procedures for obtaining a driver's license, refer to Section 7 of this guide.

Summaries of Pertinent Legislation

Topic Areas and Code Sections	Code Excerpts and Explanations
Responsibility for Driver Education ORC 3301.17	In the state of Ohio the requirements for driver education are outlined in Section 3301.17 of the Ohio Revised Code. This section places responsibility for driver education on the Ohio Department of Education: "The department of education shall expend state funds to provide driver education courses to any child enrolled in a high school for which standards are prescribed by the state board of education. . . . The department of education shall contract for the use of public school facilities to provide driver education courses where practicable, or such courses may be provided at facilities established and operated, under the supervision of transportation coordinators, by the department of education."
Exceptions to High School Driver Education Enrollment ORC 3301.17	Section 3301.17 also identifies the circumstances under which students might receive commercial training in place of regular driver education in the high school: "A commercial driver training school licensed under Chapter 4508. of the Revised Code shall receive a subsidy for each school age child who successfully completes the training school's course and who was unable to enroll in a driver education course conducted at high schools for which the state board of education prescribes minimum standards because such a course was not offered at the high school of attendance or because the pupil could not, due to scheduling difficulties, avail himself of such a course during the semester or term of the pupil's sixteenth birthday or the immediately succeeding semester or term." The legislation mentions "scheduling difficulties" thus: "For purposes of this section, a pupil shall be deemed to have scheduling difficulties if he is employed or engaged in traveling to or from

Topic Areas and Code Sections	Code Excerpts and Explanations
	his employment at the time the course is offered, or the principal of the pupil's high school of attendance determines that the pupil is involved in a hardship situation, or the principal of the pupil's high school of attendance determines that the driver education course conflicts with other courses which the pupil has scheduled at his high school." Clearly, availability of driver education must extend to all students and the exceptions permitted in enrollment do not identify a certain population of students; the exceptions are based primarily on lack of available or convenient services. The conditions and procedures for the use of the funds made available for driver education are explained in the remainder of Section 3301.17.
Availability of Driver Education to Handicapped Students	Rule 3301-81-01(E) of the Standards for Driver Education Programs states that availability of driver and traffic safety education must extend to handicapped students: Public boards of education are responsible for providing a course of driver education to all resident youth, through twenty-one years of age including, but not limited to, the following: 1. Those individuals twenty-one years of age who have graduated from high schools and who could not enroll in driver education while in high school. 2. Those individuals who have dropped out of high school and could not enroll in driver education while in high school. 3. Those individuals who moved into Ohio from another state and have not completed an approved driver education course in another state. 4. Those individuals who are handicapped.
Scope of the Student Population Served	In the history of education, students enrolled in high schools have consisted mainly of the nonhandicapped. Recent legislation has changed the scope of the student population.

Topic Areas and Code Sections	Code Excerpts and Explanations
P.L. 93-516, Sec. 504	In 1978, Section 504 of Public Law 93-516, the Rehabilitation Act Amendments of 1974[2], was put into effect. This section provided the impetus necessary to equalize education programming for the handicapped person.
Prohibition Against Discrimination Toward Handicapped	Section 504 prohibits discrimination against the handicapped in any public or private program or activity which receives federal assistance in excess of $2400 annually. Examples of such assistance include direct grants, loans, and indirect support. This requirement would by nature extend to public schools.
Responsibility of Schools Toward Handicapped P.L. 93-516, Sec. 504	Section 504 requires agencies within its scope to: 1. provide opportunities, benefits, aids, or services for the handicapped equal to those provided the nonhandicapped; 2. provide aids, benefits, and services for the handicapped in the same setting as for the nonhandicapped except in cases where their effectiveness would be jeopardized by doing so; 3. provide a barrier-free environment to insure program accessibility; and 4. recruit, train, promote, and compensate the handicapped on an equal basis. Compliance with this regulation is monitored by the Office of Civil Rights and the Secretary of Health, Education, and Welfare.
Guaranteed Free Public Education for Handicapped P.L. 94-142	P.L. 94-142, the Education of All Handicapped Children Act, guarantees a free, appropriate public education for all handicapped children ages 3 to 21. Provisions of this act which have impact on driver education are: 1. assurance that a written individualized educational plan (IEP) will be developed and maintained for each student; 2. guarantee of complete due process procedures;

[2]Amendments to P.L. 93-112, the Rehabilitation Act of 1973

Topic Areas and Code Sections	Code Excerpts and Explanations
	3. assurance that the "least restrictive educational environment" will be provided; 4. assurance of nondiscriminatory testing and evaluation; and 5. assurance of protection of the confidentiality of student records. Noncompliance with these provisions can result in the withholding of federal money for the states in question. Funds may be withheld from: • P.L. 94-142, • Title I and II Elementary and Secondary School Act, and • Vocational Education Act. The consequences of noncompliance with P.L. 94-142 apply to school systems and the state.
Ohio Guarantee of Education in Least Restrictive Environment	To comply with P.L. 94-142, the Ohio legislature enacted House Bill 455. Section 3323.04 of that act states: "The state board of education, in consultation with the department of mental health and mental retardation, shall establish procedures and standards for the placement of handicapped children in appropriate educational programs. "The state board shall require the board of education of each school district to place each handicapped child of compulsory school age residing within the district in an appropriate education program in accordance with Section 3319.01 of the Revised Code, which may include instruction in regular classes, a special education program, or any combination thereof. . . . "The state board shall establish procedures and standards to assure that to the maximum extent appropriate, handicapped children, including children in public or private institutions

Topic Areas and Code Sections	Code Excerpts and Explanations
	or other care facilities, shall be educated with children who are not handicapped." The enactment of H.B. 455 has therefore placed the responsibility of providing services to the handicapped directly on the local education agency. P.L. 94-142 and H.B. 455 have opened the door for handicapped students to be placed in a driver education course if this is deemed the "appropriate education program."
Rights to Licensure and Special Tags ORC 4503.105 (SB 162)	Senate Bill 162 added Sections 4503.105 and 4511.69 to the Ohio Revised Code, in which further description is provided regarding special concerns and regulations for the handicapped driver, including licensure, special tags, and parking: "Any person who has lost the use of one or both legs, or one or both arms, who is blind or deaf or who is so severely disabled as to be unable to move about without the aid of crutches or a wheelchair may apply to the registrar of motor vehicles for the registration of any motor vehicle he owns. When a motor vehicle has been altered for the purpose of providing it with special equipment for such a disabled person, but is owned by someone other than the disabled person, the owner may apply to the registrar of motor vehicles for registration under this section. The application for registration shall be accompanied by such documentary evidence of disability or vehicle alterations as the registrar may require by rule. "Upon receipt of an application for registration of a motor vehicle under this section, and presentation of satisfactory evidence of disability, or vehicle alterations, the registrar shall issue to the applicant appropriate vehicle registration including a set of license plates which shall, in addition to the letters and numbers ordinarily inscribed thereon, be imprinted with the international wheelchair symbol. The license plates shall be issued upon payment of the regular taxes, charges, and fees under section 4503.04 and 4503.10 of the Revised Code and without

Topic Areas and Code Sections	Code Excerpts and Explanations
	the payment of a fee for issuance under this section. "No person who is not handicapped or who does not own a vehicle specially equipped or altered for a person with a disability as described in this section shall willfully and falsely represent that he is handicapped or that he owns such a vehicle, for the purpose of obtaining a license under this section. "No person shall own a vehicle bearing a license plate issued under this section unless he is eligible to be issued such a license plate."
Right to Special Parking ORC 4511.69 (S.B. 162)	"Special parking locations and privileges for the handicapped shall be provided and designated by all political subdivisions and by the state and all agencies and instrumentalities thereof at all offices and facilities, where parking is provided, whether owned, rented, or leased, and at all publicly owned parking garages. Such locations shall be reasonably close to exits, entrances, elevators, and ramps. . . . "When a motor vehicle bearing the special handicapped license plate provided in Section 4503.105 of the Revised Code is being operated by or for the transport of a handicapped person, the motor vehicle shall be permitted to park for a period of two hours in excess of the legal parking period permitted by local authorities, except where local ordinances or police regulations provide otherwise or where the vehicle is parked in such a manner as to be clearly a traffic hazard."
Eligibility for Licensing	Section 4507.08 of the Ohio Revised Code sets out the following restrictions on eligibility of handicapped persons for a driver's license:

Topic Areas and Code Sections	Code Excerpts and Explanations
ORC 4507.08	"(B) Any applicant who has been adjudged insane or feeble-minded, or an idiot or imbecile, and who has not at the time of such application been declared restored to competency by judicial decree. "(C) Any person when in the opinion of the registrar such person is afflicted with or suffering from such physical or mental disability or disease that prevents him from exercising reasonable and ordinary control over a motor vehicle while operating the same upon the highways, provided that: "(1) A restricted license effective for six months may be issued to any person otherwise qualified who is or has been subject to any condition resulting in episodic impairment of consciousness or loss of muscular control and whose condition, in the opinion of the registrar, is dormant or is sufficiently under medical control that he is capable of exercising reasonable and ordinary control over a motor vehicle. A restricted license, effective for six months, shall be issued to any person who is otherwise qualified who is subject to any condition which causes episodic impairment of consciousness or a loss of muscular control if such person presents a statement from a licensed physician that his condition is under effective medical control and the period of time for which such control has been continuously maintained, unless, thereafter, a medical examination is ordered and, pursuant thereto, cause for denial is found. If cause for denial because of such condition is found and the period during which such condition was stated by a physician to have been under effective medical control was at least one year, the applicant has the right to a hearing before a review board constituted pursuant to division (C) (2) of this section and shall be notified thereof in accordance with the provisions of this section 119.07 of the Revised Code."

Topic Areas and Code Sections	Code Excerpts and Explanations
Restrictions on the License ORC 4507.14	Section 4507.14 of the Ohio Revised Code delineates the restrictions which may be imposed on an issued license, as necessitated by the applicant's disability: "The registrar of motor vehicles upon issuing an operator's or chauffeur's license, a motorcycle operator's endorsement, an operator's or chauffeur's license renewal, or the renewal of any other license issued under Chapter 4507 the Revised Code may, whenever good cause appears, impose restrictions suitable to the licensee's driving ability with respect to the type of or special mechanical control devices required on a motor vehicle which the licensee may operate, or such other restrictions applicable to the licensee as the registrar determines to be necessary. "When issuing licenses to a deaf person or to persons with impaired hearing, the registrar shall require that motor vehicles operated by such persons be equipped with two rear vision mirrors, one outside and one inside such motor vehicles. "The registrar may either issue a special restricted license or may set forth such restrictions upon the usual license form. "The registrar, upon receiving satisfactory evidence of any violation of the restrictions of such license, may suspend or revoke the same."
Suspension of License Due to Judgment of Mental Illness	Section 4507.161 provides that while a person is judged by the court to be mentally ill, that person's license will be suspended:

Topic Areas and Code Sections	Code Excerpts and Explanations
ORC 4507.161	"When any person having an operator's or chauffeur's license is adjudicated incompetent for the purpose of holding the license, as provided in section 5122.301 of the Revised Code, the probate judge shall order the license of such person delivered to the court. The court shall forward such license with notice of such adjudication to the registrar of motor vehicles. The registrar of motor vehicles shall suspend such license until receipt of written notice by the head of the hospital, or other agency which has or had custody of such person, that such person's mental illness is not an impairment to such person's ability to operate a motor vehicle, or upon receipt of notice from the adjudicating court that such person has been restored to competency by court decree."

3 ASSESSMENT

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Introduction

Given the importance of mobility in our society, all handicapped individuals with the potential and desire to learn to drive should be given the opportunity to learn. Therefore, all handicapped students who wish to learn to drive should be enrolled in the classroom portion of driver education, and the pre-driving assessment process (prior to the behind-the-wheel phase of instruction) should be conducted in a way that ensures that no persons are unnecessarily excluded.

The following cautions cannot be stressed too strongly with regard to pre-driving assessment:

1. The pre-driving assessment should never be aimed at screening out. The intent is not to avoid accepting students whose needs demand more of the instructor's time; rather, it should be an assessment of the students' strengths, weaknesses, and instructional needs and of any special instructional strategies or devices the instructor will need to employ. Thorough assessment will enable the instructor to conduct suitable lesson planning, grouping of students, and pre-post evaluation.

2. In the average public school setting, the outcome of pre-driving assessment should be that fewer students will be rejected permanently than accepted. If the opposite is true, the instructor should reexamine his or her approach to reveal any attitudes which might be producing a negative outlook on students' potential.

3. The instructor should avoid making hasty prejudgments. Judging a student's driving potential on the basis of the nature of the disability is unfair to the student. Such prejudgments are often proven wrong. Take the time and make the effort to give a full, complete, and objective assessment.

4. Some students will be on the borderline: a decision about their driving potential might be difficult to make. In these cases, the first several lessons may be considered part of the assessment until a determination can be made. Behind-the-wheel instruction/assessment should be continued as long as the student profits from it. Some agencies that teach driving to handicapped individuals have a policy that as long as any progress is made by the student, instruction is continued. When the student reaches a plateau and can't rise above it, only then is he or she counseled to forego or postpone further education. The individual instructor and school will have to decide to what extent such a policy is feasible, given local staffing and scheduling.

5. The student should understand that having been admitted to the program does not necessarily mean that he or she will complete the course or obtain a license. The instructor reserves the right to discontinue or postpone further education at any time that insurmountable problems occur or progress ceases.

Overview of the Pre-Driving Assessment

At present, there seems to be no reliable medically based pre-driving assessment device for use in screening.[3] Therefore, this guide recommends that, in addition to any medical information available, the first several behind-the-wheel (BTW) sessions, conducted in a traffic-free area, be used for assessment. The number of sessions that are necessary will vary from one student to the next.

Exclusions

Very few students would be excluded from such an assessment — and for most of these, their exclusion would be determined by their ineligibility for a learner's permit (see Section 7 of this guide for Ohio driver's license examination procedures). Only these factors should be cause for exclusion from assessment:

- inadequate vision (less than 20/40, corrected, in more than one eye) to obtain a learner's permit,
- a physician's refusal to give the necessary permission for a student to participate in driver education,
- an uncontrolled physical condition which can result in sudden loss of consciousness (see discussion below under "When to Conduct the Assessment"), and
- the instructor's professional opinion that behind-the-wheel instruction jeopardizes the student's or the instructor's safety.

For all other students, assessment should consist of the medical and behind-the-wheel components described below. Sample forms for recording assessment information are provided at the end of this section.

When to Conduct the Assessment

The assessment should be conducted as early in the driver education course as possible, or before it. Obtaining the learner's permit can easily take several weeks or more, so the assessment should be completed early enough so that the permit can be obtained before behind-the-wheel instruction is scheduled to begin.

If the student has a condition which can result in a sudden loss of consciousness, it is necessary to have written approval from the student's physician stating that the condition is under effective medical control. Other conditions may require an individual decision by the Bureau of Motor Vehicles (BMV) as to whether the disability prevents the applicant from operating a vehicle in a reasonably safe manner. Section 2 of this guide explains in greater detail the various laws and regulations which pertain here. Section 7 outlines the procedures for obtaining a learner's permit and a driver's license.

[3] This position is discussed in *Driving for the Physically Handicapped*, Department of Occupational Therapy, Rancho Los Amigos Hospital, pp. 37-38. (That document also contributed in a major way to the rest of this section.) However, the Kessler Institute for Rehabilitation has a battery of tests available which they feel can determine an individual's potential to become a safe and competent driver. Designed to be administered by a qualified physical or occupational therapist, these tests can be obtained from the Kessler Institute for Rehabilitation, Pleasant Valley Way, West Orange, New Jersey 07052. Additionally, "Driver Analysis Form Based on AAA Psychophysical Test Scores" is available from the AAA Traffic Engineering and Safety Department.

Medical Assessment

Sources of Information

Medical information will come primarily from three sources: health field specialists, the student, and the instructor's observation. Other possible sources are also listed below.

Specialists. In some cases, medical information will be available in the student's records. This might include physicians' statements, reports from therapy programs, information on learning disabilities, or other information. Some students will obtain physicians' statements as part of the application process for the learner's permit.

The instructor should try to obtain as much of this type of information as possible. In complex cases, a conference with a specialist to learn about the ramifications of a disability would be helpful.

The student. Many students with visual, hearing, or physical handicaps will be good sources of information about themselves. (Some students with mild mental handicaps might also be good sources.)

Often, students can tell you the name and nature of their disability, what they can do, and what they have had problems with. (Beware of extremes; however, frustrated, discouraged students may underestimate their potential; students who have not accepted a disability may overestimate their potential or assure you that the disability is gradually disappearing.)

The instructor. The instructor's observations, in combination with the information contained in Sections 4, 5, and 6 of this guide and the booklet which accompanies Section 6, should enable the instructor to formulate a general idea as to the nature of the student's disability and the kinds of compensating techniques and devices which might be needed. It is often helpful to observe the student in other classes and settings to get a better impression of the student's capacities, deportment, and maturity level.

Others. Other individuals can also be helpful:

- parents
- special education teachers
- speech and hearing therapists
- school nurses
- counselors
- school psychologists
- teachers in physical education and in other subject areas where psychomotor skills can be observed

Types of Information

The medical assessment should provide the information discussed below (as appropriate). For some students, not all these types of information will apply (for example, for a student with no physical complications, items 4, 5, and 7 might not apply).

1. Diagnosis. The diagnosis (provided by specialists) will identify the disability and, in some cases, describe its effects. After reading the appropriate section of this guide in which the diagnosed disability is discussed, the instructor should be able to understand generally the mental, sensorial, or physical aspects of the condition and whether the condition is progressive.

2. Seizures, loss of consciousness, and medication. It is important to find out whether these factors are a part of the student's condition because they may require special procedures or, in some cases, exclusion from behind-the-wheel instruction. These factors were discussed above, under "Exclusions." Section 6 describes disabilities which might be accompanied by these factors. Sections 2 and 7 describe the laws and the driver license examination procedures relating to these factors.

3. Date of onset of disability. Whether the disability is congenital or acquired after birth and, if acquired, how recently the disability occurred can be very valuable information. Date of onset may have impact not only on the extent of disability but also on the social and emotional maturity of the student, which is an important aspect of assessment. This is discussed in more detail in Section 5.

4. Endurance. Endurance is often measured in how many hours per day the student spends out of bed. Knowing the student's level of endurance and whether it is likely to improve or decline is of importance especially when conducting the behind-the-wheel phase of instruction. This is discussed in more detail in Section 6.

5. Student's functioning ability in upper and lower extremities. This data plus the information contained in Section 6 should enable the instructor to make tentative arrangements for adaptive controls and devices.

6. Cognitive abilities. This information should include any perceptual, judgmental, or learning problems the student might have. The behind-the-wheel evaluation will help the instructor to understand more easily the nature and impact of these conditions on the driving task. This is discussed further in Sections 4 and 6.

7. Transfer. The student's present and potential ability to get into and out of a car independently and to become positioned properly behind the steering wheel will influence the scheduling of in-car instruction, the time spent on learning and practicing transfer skills, and the necessity of transfer assist devices. Transfer is discussed further under "In-Car Orientation" and in Section 6.

The instructor cannot know too much about the student. It is suggested that some time be spent studying all available data before conducting other parts of the assessment and making any judgments regarding driving potential.

Behind-the-Wheel Assessment

There are three components of behind-the-wheel assessment, which are discussed below: initial interview, in-car orientation, and behind-the-wheel evaluation. Each of these components can require one or more sessions with the student, depending on the disability.

Initial Interview

This interview takes place in the classroom or office setting. The purposes of the initial interview are:

1. to establish rapport with the student,
2. to gather any information not already obtained,
3. to gain some insight into the social and emotional maturity and general attitude of the student, and
4. to make some preliminary estimations of assist devices and controls that might be needed.

If this interview takes place at the very beginning of the course or before it begins, it will naturally require longer to accomplish these objectives than if the instructor and student have established a relationship during the classroom phase. If rapport and understanding of the disability have been established before the interview, the interview itself may be quite brief and lead directly into the in-car orientation.

The following are guidelines for conducting the initial interview:

1. Review the medical assessment before the interview. Using the sample information forms provided at the end of this section, complete as much of the information on the forms before the interview as possible and supplement it during the interview.
2. If you expect the interview to lead right into the in-car orientation the same day, prepare a car with any driving aids judged to be necessary on the basis of the medical assessment before the interview. As the BTW assessment proceeds, the full equipment needs will become more evident.
3. Be supportive and tactful, as the student might be excessively anxious.
4. Do not, at this point, prejudge the student's potential for driving.

In-car Orientation

In-car orientation usually takes place in a parking lot, with the car stationary. The purposes of in-car orientation are:

1. to enable the student to become somewhat familiar with the basic controls and adaptive devices in the car,

2. to enable the instructor to gain further insight into the student's potential to drive, and

3. to enable the instructor and student to make further judgments about the need for adaptive controls (needs might be greater, less, or different from those originally estimated).

Use of in-car orientation should be flexible, tailored to the needs of the student. It might take one or more sessions to complete and might require time for readapting the car to meet individual needs. Or, it might take very little time (especially when there are no adaptive controls) and lead right into the behind-the-wheel evaluation.

The following are general guidelines for this phase of the behind-the-wheel assessment:

1. Let the student attempt to enter the car unassisted. This will give the instructor a better idea of the amount of time necessary for entry and exit when scheduling behind-the-wheel instruction and will indicate whether transfer training or assist devices are required.

2. Be patient. Assist the students physically only when they are clearly unable to enter after a concerted attempt.

3. Most drivers with wheelchairs will enter the car one of two ways: (a) enter on the passenger side, pull the chair in after transferring, and fasten it on the passenger side of the front seat or (b) enter on the driver side and pull the chair into the back seat directly behind the driver. The student need not attempt to put the chair in at this point in the assessment; the instructor should stow the chair in the back seat or trunk for the student. The ability to pull in and secure the chair should, however, be assessed — and, if necessary, taught — at some time during instruction.

4. Explain and demonstrate each control and device. Do not rush this part of the orientation. Some students might require that one device at a time be explained, demonstrated, tried, and practiced repeatedly before another is introduced. Others will profit more from a general overview of all controls before trying each one and practicing its use.

5. Observe carefully the student's manipulation of each control in order to assess the appropriateness of the control for the individual.

6. If necessary, change, remove, or add controls during orientation to suit the student's abilities and needs.

Behind-the-Wheel Evaluation

If there are any doubts as to the student's potential to drive, a BTW evaluation should be conducted in a traffic-free area such as a range or parking lot. The purpose of the BTW evaluation is to complete the assessment of the student's potential for learning to drive. It is important to remember that, in many cases, it will take more than just one or two sessions to accomplish this evaluation. There may be no clear difference between BTW evaluation sessions and BTW instructional sessions because for some students the only way to assess driving potential is to give them the opportunity to try.

However, for most students after five or six sessions it should be fairly clear to the instructor and the student whether it is appropriate to continue. (In the case of students with cerebral palsy, as many as ten or fifteen sessions might be required.) For those who do continue, the evaluation is actually the beginning of the BTW portion of the course. Those who do not possess adequate potential will eventually have to discontinue the BTW portion of the course either permanently or until a later time. Students who continue should understand that acceptance in the course does not guarantee that they will finish the course or get a license. Instruction may be discontinued at any time the instructor deems it necessary.

During the BTW evaluation, the instructor should assess potential in the following skill areas, which are discussed below:

1. transfer,
2. acceleration and braking,
3. right and left turns, and
4. serpentine or figure eight.

Transfer. In the case of a student with a physical handicap, assess the student's ability to get in and out of the car. Section 6 describes some transfer assist devices that can be used. If the student with lower extremity disabilities has not already had transfer training from a physical therapist, it might be appropriate to refer the student to such a program. The student must realize that if the ability to transfer without assistance is not developed at some point, some rather costly equipment might have to be acquired for the personal car.

NOTE: Ohio law does not require that driver's license applicants be capable of independent transfer; however, unassisted transfer greatly enhances the driver's independence and safety in case of emergency, and is therefore highly desirable.

Accelerating and braking. Assess the student's ability to accelerate and brake while moving in a straight line. This should be done both for students using regular accelerator and brake mechanisms and for those using hand controls. For some students it might be necessary at first for the instructor to steer while the student concentrates on acceleration and braking. Then, if the student is successful with this phase, have the student steer in a straight line while accelerating and braking. This assessment can be used to observe:

1. strength and reach of legs and flexion (range of motion) of hips if using regular controls,
2. strength, reach, and range of motion of arm and flexion of wrist if using hand controls,
3. ability to accelerate and brake with one arm and steer with the other if using hand controls, and
4. reaction time.

Right and left turns. A simple rectangular course can be used to assess the student's ability to turn left and right by driving the course in both directions. Use this assessment to judge:

1. range of motion and strength of arm and shoulders (if steering with one or both arms),

2. ability to use adaptive steering devices, such as knob, ring, post, or quad grip,

3. leg and hip flexion if using foot steering, and

4. ability to coordinate accelerating and braking with turning.

Serpentine or figure eight. Use one of these configurations to assess:

1. turning ability,

2. range of motion, reach, and strength of arm and shoulders, and

3. endurance.

Other. When there is question about the functional use of some part of the body, conduct specific assessments to evaluate abilities in this area. For example, if range of motion of the neck or shoulders is in question, ask the student to back up using rear and side view mirrors and looking over the shoulder. This might point out a need for supplemental mirrors.

Outcomes

Remember that you are assessing the student's potential to learn to drive, not the ability to drive. Gaining the ability to drive is, of course, a major goal of the student's participation in driver education.

The outcomes of the combined medical and behind-the-wheel assessments will vary greatly with each student — not only in terms of the decisions they lead to, but in terms of the relative certainty with which you are able to make the decisions and the time it takes to be able to make these decisions. In each case, all available information will have to be weighed together. Do not ignore such subjective (but important) influences as student interest, motivation, and maturity.

The following are a few general statements that can be made about assessment outcomes:

1. For many students the basic maneuvers will present no serious problems. These students should be encouraged to continue in the course.

2. Severe physical limitations may prevent some students from adequately controlling the car. If, after extensive experimentation with different kinds of adaptive devices, the student is unable to control the car, the student should be counseled to discontinue driver education. However, in some cases in which the onset of disability has

been fairly recent, the student might have some prospect of improvement. Additionally, the student might be encouraged to investigate the possibilities of more complex custom-designed equipment, such as a van.

3. If the student's level of endurance is such that he or she can drive for only five or ten minutes at a time, it is probable that this student is too weak to benefit from the BTW portion of driver education.

4. Some students with cognitive handicaps will exhibit difficulty in coordination perception, judgment, and/or planning. Perhaps they will misjudge the amount of available space or be unaware of the precise position of the car relative to other objects around them. In some cases, these students will progress with time. If not, these students probably do not possess adequate potential to drive and should be counseled to this effect. A decision in such a case may require many sessions, continuing until the student shows no progress at all.

5. Some students with learning disabilities, mild mental handicaps, or brain damage can be very difficult to assess. Many times they will show very little potential for driving; however, time and the student's motivation are often the deciding factors.

Student Biographical Data

Sample Form

Student

Name _____

Soc. Sec. No. _____

Date of Birth_____ Age_____

Sex____Height_____Weight_____

Parent or Guardian

Name _____

Home address _____

_____

Phone_____ Emerg. Phone_____

Physician or Other Specialists

1. Name _____

   Address_____

   _____

   Phone _____

2. Name _____

   Address_____

   _____

   Phone_____

Nature of Disability_____

_____

_____

_____

_____

_____

Onset of Disability: Congenital_____

Acquired (date)_____

History of . . .	Extent of Control
Seizures? ____	_____
Loss of Consciousness? __	_____

Current Medications	Possible Effects on Driving
_____	_____
_____	_____
_____	_____

Endurance Limitations

Visual Limitations

Physical Limitations

Hearing Limitations

Cognitive Limitations

Maturity Limitations
(attitude, observed behaviors, etc.)

Additional Comments

Interviewer's Signature _____ Date_____

Equipment Adaptation Recommendations Sample Form

Student's Name_____ Date_____ Class Schedule_____

Controls and Devices Notes

1. Brake and Accelerator

- ☐ hand brake and accelerator_____
  - ☐ right hand
  - ☐ left hand _____
- ☐ left foot accelerator _____
- ☐ parking brake _____
  - ☐ all hand-operated
  - ☐ all foot-operated _____
  - ☐ extension

2. Steering Controls

- ☐ spinner knob _____
- ☐ "V" _____
- ☐ quad grip (tri-post or cuff) _____
- ☐ amputee ring _____

(Mark location on wheel.)

- ☐ extension of steering column _____
- ☐ small diameter wheel _____
- ☐ foot plate steering _____

Controls and Devices	Notes

3. Transfer Devices

- ☐ self-assist handle _____
- ☐ self-assist strap _____
- ☐ transfer board _____

4. Dash Board Controls

- ☐ left hand _____
- ☐ right hand _____
- ☐ forward extensions _____
- ☐ rings _____

5. Other Devices

- ☐ turn signal _____
  - ☐ right hand extension
  - ☐ forward extension _____
  - ☐ floor mounted
- ☐ gear shift _____
  - ☐ left hand extension
  - ☐ forward extension _____
  - ☐ floor mounted
- ☐ dimmer switch, hand-operated _____
- ☐ horn _____
  - ☐ hand button
  - ☐ floor mounted _____
- ☐ ignition _____
  - ☐ key holder
  - ☐ extension _____

☐ safety belts _____
- ☐ regular
- ☐ chest type _____

☐ cushions _____
- ☐ additional arm rests
- ☐ bottom _____
- ☐ back
- ☐ contoured _____

☐ mirrors _____
- ☐ side view
- ☐ convex rear view _____
- ☐ multiview interior rear view

6. Additional Adaptations

_____

_____

Interviewer's Signature_____ Date_____

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Behind-the-Wheel Assessment Summary Sheet Sample Form

Student's Name_____ Date _____ Class Schedule _____

Adaptive Controls, Devices

Devices required:	Remarks (ability to operate, modifications needed, etc.):
_____	_____
_____	_____
_____	_____
_____	_____

Transfer

Devices required:	Remarks (ability to transfer, time required, education needed, etc.):
_____	_____
_____	_____

Communication

Problems:	Instructional strategies (sign language, simple conceptual constructs, vocabulary development, etc.):
_____	_____
_____	_____
_____	_____

Maneuvers

		Remarks (need for special instruction, additional car modifications, etc.):
acceleration	☐	
steering	☐	
acceleration and steering	☐	
braking	☐	
braking and steering	☐	
right turn	☐	
left turn	☐	
serpentine / figure 8	☐	
other _____	☐	

4 MILD MENTAL HANDICAPS

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Introduction

The greatest proportion of handicapped students the driver education instructor will encounter are those with nonphysical handicaps. According to figures projected by the Bureau of Education for the Handicapped, the incidence of educable mental retardation among children ages 6 to 18 is 2%, as compared with .50% orthopedic, .575% hearing impaired, and .10% visually impaired.[4] More and more of these students are receiving at least some portion of their education in the regular classroom (see Section 2 of this guide, "The Law"). Clearly, the instructor needs to be prepared to work with students who have mild mental handicaps who, sooner or later, might take part in driver education classes.

Many people who have had little firsthand experience with mentally handicapped people are uncomfortable with the idea of mentally handicapped individuals driving automobiles. This attitude is generally based on lack of exposure to the population and on false assumptions. For example, it may be assumed that mentally handicapped people cannot become competent and safe drivers. It is also assumed that if mentally handicapped individuals are not provided driver education, they will not drive (and, therefore, they will not enter into the problem of traffic safety). Neither of these assumptions is true.

Recent research, in which driving records were examined, has shown that the mentally handicapped drivers as a group are not significantly different from nonhandicapped drivers of average intelligence. In fact, the handicapped drivers had better driving records than persons of above average intelligence. Furthermore, it has been shown that persons who have mental handicaps are indeed purchasing and operating automobiles on the highways, with or without the benefit of driver education. Mentally handicapped youth actually spend more time in their automobiles than others in the same age group, indicating, perhaps, that the automobile is an important element of their social lives.[5]

Therefore, it is vital that those with mild mental handicaps be given the same opportunity to learn safe driving skills in the public schools that nonhandicapped students receive and that this education be designed so that the students have a chance to succeed.

To meet the objectives of driver education for the mild mentally handicapped population, an interdisciplinary approach utilizing the talents and expertise of driver education and special education teachers has promise of giving the student the best opportunity to be successful in learning to drive. The Michigan Department of Education, in a guide designed to be used in conjunction with a driver education curriculum guide, points out the understandings that teachers in each of these specialties need to develop in order to participate effectively in this type of interdisciplinary approach:

The special education teacher needs to develop a greater understanding of:

1. objectives of driver education,
2. sequence of the objectives of driver education,

[4] Figures used by the Bureau of Education for the Handicapped in public hearings on P. L. 94-142.

[5] *Driver Education for the Handicapped: A Resource Curriculum in Driver Education Teacher Preparation*, James E. Aaron and David G. Kraemer, p. 10.

3. content of driver education,

4. scheduling difficulties in driver education,

5. evaluation in driver education and of the driver, and

6. appropriate instructional materials and time for providing supportive instruction.

The driver education teacher needs to develop a greater understanding of:

1. learning problems of the mentally handicapped,

2. methods for presenting instructional materials,

3. techniques for structuring learning experiences, and

4. means of evaluating driver education for mentally handicapped students.[6]

Interdisciplinary approaches are discussed further under "Scheduling Approaches" in this section. Whether or not the driver education instructor is in a school situation where an interdisciplinary approach can be effectively carried out, the driver education instructor who will be working with mentally handicapped students needs understanding of the concepts listed above. It is the purpose of this section of the guide to help the instructor begin to develop these types of understanding. Toward this end, the following topics are discussed in this section:

1. characteristics of mild mentally handicapped learners (and what to do about them)

2. additional classroom strategies, and

3. scheduling approaches (including advantages and disadvantages of each).

These discussions are not seen as being complete studies of any of the topics. Nor can they take the place of frequent consultation with, or participation of, a special education teacher. Rather, they are intended to provide some basic awareness and practical ideas for working with mild mentally handicapped learners.[7]

CAUTION: It cannot be stressed strongly enough that the instructor, in using this material, must keep in mind that MMH students are not alike, any more than nonhandicapped students are alike. Generalizations about MMH students should be avoided; prejudging what the student will be able to accomplish is both foolish and extremely detrimental to the student. MMH students are continually proving such preconceptions wrong. Furthermore, negative prejudgments on the part of a teacher can cause learning barriers which will make it difficult or impossible for the student to succeed.

[6] *Driver Education Programming for the Mentally Handicapped*, p. 2.

[7] Although this section of the guide deals specifically with mild mentally handicapped learners and is not intended to cover other nonphysical disabilities (such as learning disabilities, behavioral disorders, and remedial and clinical reading problems), some of the suggested strategies might nonetheless be useful in working with students who have these disabilities. For brevity, mild mentally handicapped learners are referred to as MMH learners throughout the remainder of this section.

Characteristics of MMH Learners and What to Do

Some characteristics which might be observed of mentally handicapped individuals are listed on the following pages, with suggestions for dealing with them.[8] Again, it must be noted that it is dangerous to generalize about this group of people and that these characteristics are simply those the instructor should be ready to recognize, should they appear in individual students.

[8]For additional discussion of these characteristics, see Aaron and Kraemer, *Driver Education for the Handicapped*, pp. 44-49

Characteristics Sometimes Found	Suggestions for Instruction
1. "Failure" Patterns Generally, one of the major difficulties in teaching the mentally handicapped to drive stems from their poor ability to understand their limitations. This may in turn cause them to have unrealistic expectations of themselves. They then attempt things beyond their present capability, expecting to succeed at the same rate or to the same degree as their nonhandicapped peers. Failure to perform up to their expectations causes them to feel inadequate. By the time the MMH student has reached adolescence, situations that produce feelings of inadequacy have occurred in such abundance that the student has built up some pattern of response to them. One such response is easily triggered frustration. A seemingly minor incident will create a frustration level out of proportion to the situation. Frustration may be demonstrated through anger — at the instructor, at him- or herself, or at the task. The student may cry over such an incident. Another response is to become extremely dependent on others. The student may depend on being led through each step, on being reinforced for each small achievement, and on being encouraged to keep trying. One student's response may be to give up easily, refusing to try again if unsuccessful the first time. Another student may refuse to try a new skill at all, avoiding the failure which he or she expects to be the outcome of such an attempt.	In dealing with failure patterns, manipulate the learning experience to minimize those frustrating situations which have no obvious benefit. Examples: • If the student is about to try a task for which he or she is likely to fail, break the task down into more steps and redirect the student to an intermediate task which is challenging but at which the student has a better chance of succeeding. • If posing a general question to the class for which a number of answers might apply, avoid calling on the MMH student first. Allowing the student to "get the drift" of the question by listening to other answers can help avoid a frustrating situation. • If the MMH student is with other students in the laboratory car, have the other students try a maneuver first, so the MMH student has an opportunity to hear the instructions and see the maneuver several times before attempting it. • Conduct preliminary practices (talk through the maneuver while the student practices at a desk in class) to help prepare the student for in-car instruction. Patience on the part of the instructor will be helpful both in avoiding acute frustration and in dealing with a frustrating or emotional situation when it occurs.

Characteristics Sometimes Found	Suggestions for Instruction
Some students may emanate a false bravado to camouflage feelings of inadequacy.	
2. Self-Devaluation	
Another characteristic deriving from the MMH student's inability to cope with personal limitations is self-devaluation. The fact that we live in a world which stresses competition and adequacy, coupled with frequent misjudgment of personal abilities and limitations by the handicapped student, causes the MMH student to lose in competitive situations frequently and to develop low self-esteem.	Structure the learning experience to emphasize the student's individual adequacy rather than competitive limitations. Examples: • Break learning objectives down into subobjectives to be mastered incrementally. Not only will the student have a better chance of succeeding on subobjectives, but each mastered subobjective will contribute to the student's ability to master the terminal objective.
Again, this pattern can lead the student to expect and fear failure, refuse to try, give up easily, and react in anger to challenges.	• Overly reinforce the student's successes. A compliment or acknowledgment of a task well done will help to balance the student's own self-devaluing focus on failures. • Avoid classroom gaming strategies that require quickness of response. Similarly, avoid open comparisons of performance among students. When failure does occur, use it in a way that makes it a positive learning experience and a bridge to future successes. In so doing, the instructor can help the student in shaping a self-concept more nearly consistent with reality. Example: • When the student activates the turn signal at the last minute before turning, the instructor might say something like, "I'm really pleased that you used the signal before you turned. Next time, try to turn it on earlier, so cars behind you will have plenty of warning before you slow down."

Characteristics Sometimes Found	Suggestions for Instruction
3. Sensitivity to Surroundings The MMH student is usually quite sensitive to the attitudes of others. Often, the student knows whether the instructor and other students are accepting and friendly or just tolerant. Acceptance of the student is extremely important if the student is going to maintain dignity and achieve as high a level of self-actualization as possible.	Use eye contact, smiles, a pleasant voice, and positive "body language" to relay a message of acceptance. Talk in your natural voice, without sing-song tones. Speak simply but never talk down to the student. Set an example for the other students by stressing the positive and treating the MMH student with dignity.

4. Slow Response to Sensory Stimuli
 	
Responding slowly to visual and auditory cues (for example, applying the brakes when a hazard is seen ahead) can be a problem for the MMH student driver. However, research has shown that MMH students not only can improve psychomotor skills, but have high retention for what they learn.
	Employ clear and patient explanation, demonstration, repetition, and plenty of practice to help the student build psychomotor skills.
	
	Avoid lengthy verbal explanations; the student tends to "get lost" in the language. When possible, use modeling – carefully structured step-by-step demonstration with the student imitating. Example:
	
	• To teach release of a right-hand parking brake, the instructor might demonstrate these steps, first as a whole operation, then one at a time with the student repeating each step:
	
	  • reach to parking brake with right hand
	
	  • put thumb on release button
	
	  • grasp handle with rest of hand
	
	  • press button in (with slight upward pull on handle) and feel for the release of the brake
	
	  • holding in button, push handle down as far as it will go
	
	  • let go of button and handle

Characteristics Sometimes Found	Suggestions for Instruction
	Place a great deal of emphasis on continual scanning and other defensive driving techniques. These are especially important for MMH drivers, to give them as much response time as possible.
5. Short Memory and Attention Span The MMH student may exhibit poor retention of learning and a short attention span. This is especially likely if: • too much material is given at one time • too little time is allowed for learning the material • too little practice is provided at the incremental stages • the material is very abstract It is important that the instructor keep this in mind while planning for the instruction and providing for supplementary learning materials.	Material that is carefully paced, exciting, and meaningful to the student will be retained longer than that which is overloaded with information or dull or which has little or no relevance. If the student comprehends the material and finds it interesting, this will often work to increase the student's attention span. Minimize the effects of poor retention and short attention span by developing or selecting classroom materials and teaching strategies according to these few important criteria: • Present concepts one at a time, in a step-by-step logical progression. • Provide time and practice at each step, before moving to the next concept. • Use active, participatory classroom strategies whenever possible. • Make explanations as concrete as possible, using direct language, real objects, demonstrations, pictures, simple visuals, and multimedia presentations. • Vary activities and materials from one lesson to the next. • Give examples that relate to adolescent interests and experiences. • Where written material is used, be sure the reading level is comprehensible, the text attractively displayed and illustrated, and the emotional appeal appropriate to the age level.

Characteristics Sometimes Found	Suggestions for Instruction
	Reduce distractors in the classroom. Examples: • Reduce visual distractors such as "busy" decoration or displays, too many bright colors, or unnecessary motion. • Reduce auditory distractors, such as unnecessary commotion, simultaneous small group activity or discussions, or outside noise coming in through open windows or doors. Have special education teachers or counselors provide supplemental instruction. This should be done in short sessions, reinforcing what was learned in class. When giving driving instructions in the laboratory car, give one direction at a time. Examples: • Say, "There at the next corner, turn right," rather than, "Turn right at the next corner, go a block, turn left at the stop sign, and pull over at the school." • For simplicity and brevity, use key words for frequently used concepts (for example, "corner," "light," or "right turn").
6. Difficulty in Dealing with Abstractions Usually, the MMH student has difficulty dealing with abstractions and generalities. For example, principles of motion might be more difficult to understand than the fact that pressure on the accelerator makes the car move.	Keep concepts as concrete and functional as possible. Put definitions of objects in terms of what the objects do. Example: • The accelerator can be described in terms of causing the car to move, rather than its relationship to various parts of the engine and fuel system. Relate abstract concepts to practical applications with which the student might be familiar or in which the student is likely to become interested.

Characteristics Sometimes Found	Suggestions for Instruction
	Try to organize content so that each activity or topic calls upon both conceptual and psychomotor skills. This helps maintain the student's interest (and therefore stimulates learning) and does not overload the student at any one time with conceptual demands.
7. Poor Transfer of Learning Many MMH students exhibit a deficiency in seeing commonalities among similar situations separated in time and space. The driving task, however, demands that the student recognize situations as being similar and therefore requiring similar responses. The instructor cannot count on the student's ability to transfer learning from one situation to another without explicit direction. Similar situations will often be perceived by the student as new and different.	Organize lessons and learning experiences by topic area to reinforce the relationships within the area. It is very helpful to actually teach categorical concepts. This can be done by presenting (on picture or film) two very similar situations and leading the student to recognize the similarities between them. (See example A, below.) As the student successfully recognizes the similarities, situations can be presented whose similarities are a little less obvious, until the student can draw comparisons among common driving situations. (See examples B through D.) Sample sequence of situations: Ex. A: Picture 1 - A green car hits a red car from behind at a stop light. Picture 2 - Another green car hits another red car from behind at a stop light. Ex. B: Picture 1 - A green car hits a red car from behind at a stop light. Picture 2 - A blue car hits a red car from behind at a stop light. Ex. C: Picture 1 - A yellow car hits a black car from behind at a stop light. Picture 2 - A white car hits a gray car from behind at a stop light.

Characteristics Sometimes Found	Suggestions for Instruction
	Ex. D: Picture 1 - A yellow car hits a green car from behind in an intersection. Picture 2 - A pink car hits a blue car from behind on a freeway ramp. Note that these pairs of situations have progressed from being almost identical to being similar only in that they are rear-end collisions. They therefore require increasing transfer ability on the student's part. When using a simulator, lead the student to recognize similarities between what is being done and what was done in another kind of activity (e.g., pushing chairs to simulate turns). When a student is in the laboratory car, point out similarities between present maneuvers, those practiced on the simulator, and those already accomplished behind the wheel. Repeat simulator or range experiences to reinforce learning.
8. Tendency Toward Habit Formation Generally, the MMH student is strongly bound by habits. This will play an important role in learning driving skills because so much of the driving routine is based on habit formation. This can be an advantage for the MMH student, as good driving habits quickly become habitual. However, if poor driving techniques are allowed to develop, they too will become habitual and difficult to change.	Take extreme care that each driving habit formed is correct the first time or that mistakes are quickly corrected.

Characteristics Sometimes Found	Suggestions for Instruction
9. Inability to Evaluate Own Efforts Just as MMH students are often unable to gauge their limitations and abilities properly, they also have difficulty determining how their efforts measure up to given standards.	Provide constructive feedback frequently to help the student gauge progress, build confidence, and avoid acquiring poor driving habits.
10. Deficient Verbal Abilities Generally, MMH learners have limited ability to understand long, complex verbal communications. The greatest problems are likely to be caused by: • speaking in long, complex sentences, • talking at length without giving the student a chance to question, repeat, practice, or give other feedback, • using new or difficult terms for which the student is not prepared, and • discussing a topic in a disorganized way.	When talking to the student or the class, make simplicity your goal: • Structure language as simply as possible. • When there is more than one way to say something, choose the simpler words. • Omit unnecessary language. • Introduce new words carefully (don't expect the student to "pick them up" from the context). • Don't "run on" unnecessarily; be sure one thought is understood before introducing another. It is important to keep in mind that it is possible to speak in clear, basic language without being condescending or sounding like you are talking to a child.
11. Need for Vocabulary Development MMH students are often less able to figure out the meaning of new terms from the context in which they are used than students with a higher degree of verbal skill. They are likely to require explicit vocabulary development for any new terms before the terms are used in context. This way, they aren't faced with the double task of figuring out the meaning of a word while trying to understand a sentence in which the new word is used.	Teach the vocabulary needed for each lesson. This can be done in several ways: • Write words and definitions on the chalkboard before class, then point to or circle each word when it is used in the lesson. • Prepare vocabulary handouts and give them out at the end of the preceding lesson. These should be at a basic reading level (third to fifth grade, depending on the student).

Characteristics Sometimes Found	Suggestions for Instruction
	• Prepare flash cards for each lesson and give them to the student at the end of the preceding class session (to be returned to the instructor) so the student can practice with the vocabulary at home. Assistance from another student during a free period can be very helpful in practicing with flash cards; this might be especially important in learning vocabulary for the learner's permit examination. • Spend a few minutes at the beginning of each lesson teaching vocabulary for that day's lesson. Don't let vocabulary become a barrier to successful performance evaluations. Avoid introducing unfamiliar vocabulary on tests. Define any difficult new words that can't be avoided. Encourage students to ask for clarification of any words they don't know. If necessary, give verbal tests. Many multisyllable words are currently used in the Ohio driver preexamination. It is vital that the MMH student receive vocabulary instruction for any of these that are unfamiliar. Pretests will help determine how much vocabulary development is needed.

Additional Classroom Strategies

The following are a few general classroom strategies which can be helpful not only for teaching handicapped students, but for teaching nonhandicapped students as well.

1. Alternative Strategies

   In some cases, having MMH students read driver education materials — while possibly helping to develop their reading abilities — does very little to develop their understanding of the concepts of traffic safety. Try other strategies, such as explanation, discussion, demonstration, role play, use of audiovisuals, simulation, and other participatory techniques. Consult with the special education teachers to learn about strategies that have been particularly effective with the individual students.

2. Audiovisuals

   Use audiovisual materials (films, filmstrips, slide/tape presentations, transparencies, and others) whenever possible. A partial listing of films is provided in Appendix B. Potential sources for audiovisual materials include:

   - Ohio Special Education Regional Resource Centers
     There are currently sixteen such centers located around Ohio. They offer a wide variety of services, materials, and information for working with handicapped students. For a current directory of SERRC centers, contact: Ohio Department of Education, Division of Special Education, 933 High Street, Worthington, Ohio 43085 (614-466-2650).

   - American Red Cross
     To locate county chapters of the American Red Cross, look in the white pages of the telephone directory.

   - American Automobile Association
     To locate local offices, look up "AAA Auto Club" in the white pages of the telephone directory.

   - Ohio Department of Education, Educational Media Center, 65 South Front Street, Columbus, Ohio 43215

   - Ohio Department of Highway Safety, 240 Parsons Avenue, Columbus, Ohio 43205.

   - Ohio Department of Transportation, 25 South Front Street, Columbus, Ohio 43215.

   - Ohio Traffic Safety Education Center, The National Center for Research in Vocational Education, The Ohio State University, 1960 Kenny Road, Columbus, Ohio 43210 (614-486-3655).

Contact each of these sources for listings of materials currently available.

Use drawings, chalkboard diagrams, and situation boards with magnetic or friction-bond cars that can be moved around to depict situations and maneuvers.

3. Simulators

Simulators are ideal for providing ample opportunity for practice. When using simulators, stop them frequently so that the action does not occur too fast. Reinforce and review progress at frequent intervals. Repeat portions as often as necessary.

4. Role Play

In addition to discussion and demonstration, try role play and acting out to teach such concepts as negotiating intersections and access ramps. Set these configurations in an open space and have the students walk through them pushing chairs. Have students act out accelerating, braking, turning, and backing as they sit in their seats.

5. Peer Coaching

Peer coaching can be a very successful strategy. Encourage advanced MMH students or nonhandicapped students to tutor beginning MMH students on given topics.

6. Simplified Objectives (through task analysis)

Some theorists maintain that the human brain can deal with only one thing at a time at a conscious level. Nonhandicapped people can do this so quickly that they appear to be learning many things simultaneously. The MMH student, however, has more difficulty dealing with multiple concepts or with several concepts in rapid succession. Teaching can easily be tailored to this limitation and — through the effort and organization that go into such tailoring — can benefit all students, whether handicapped or not. Here are some ideas with regard to objectives:

- Take the standard driver education objectives and break them down into finer increments. Here is a simple example:

  "Fasten seat belt" might be broken into the following subobjectives:

  Grasp left belt in left hand.
  Grasp right belt in right hand.
  Place right prong at left receptacle.
  Push right into left until fixture snaps.

- Teach only one thing at a time. Be sure the concept is thoroughly mastered before introducing a new concept. For example, let the student master steering while the instructor operates the accelerator and brake. Then, when the student has mastered steering, introduce accelerating. When the student has mastered accelerating, introduce braking.

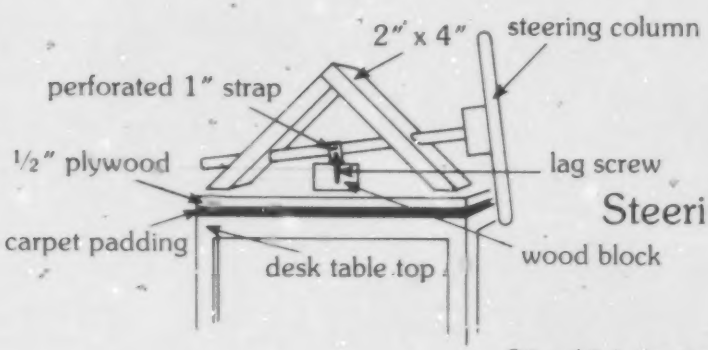
7. Practice Equipment

Bring steering wheels (obtainable from junk yards) to class. Allow students to get the feel of gripping them and turning them various degrees. If the wheels can be affixed to table or floor shafts, this is ideal (see diagram); however, unattached wheels can be quite useful for elementary turning maneuvers and for role play.

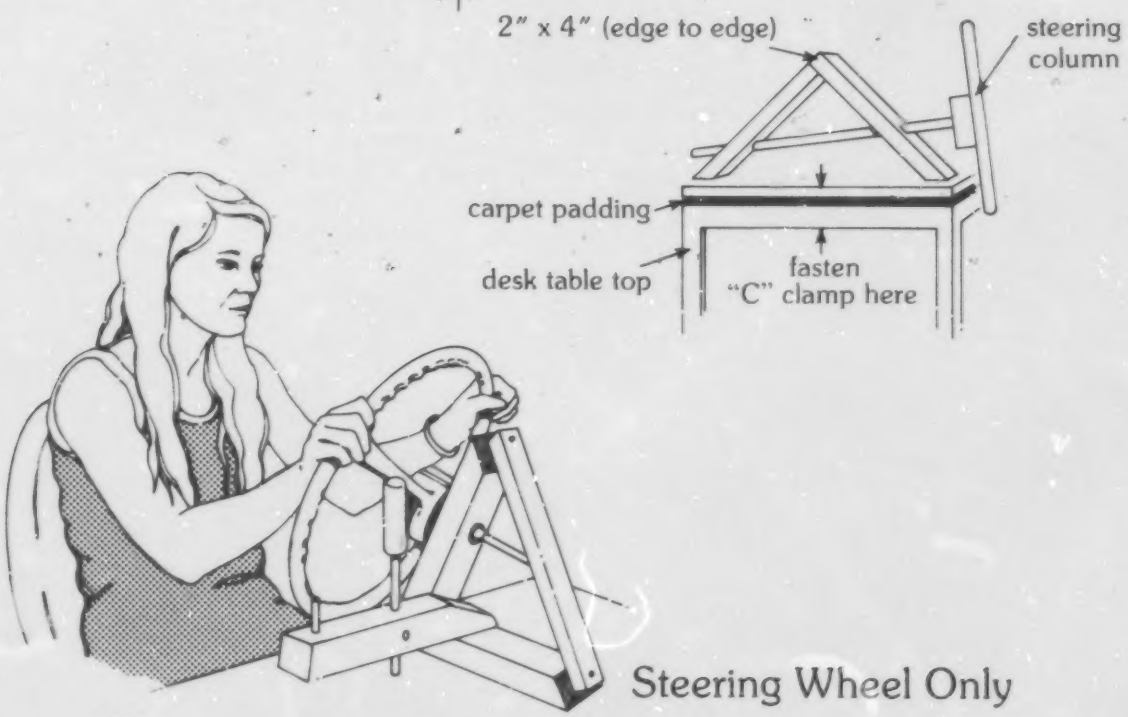
Have students practice turn signals and other skills while pushing chairs along traffic patterns marked on the floor. Some people have reported using powered golf carts as practice vehicles.

8. Preparation for Testing

Teach test taking skills so that test situations are not in themselves barriers to success (see Section 7 in this guide). Try wearing a uniform to simulate the test atmosphere, or ask a patrolperson to participate in practice sessions.



Steering Wheel with Column



Steering Wheel Only

Develop a good rapport with the examining station personnel to help them overcome any misunderstandings they might have in regard to mentally handicapped drivers. Visit the examining station personally; learn the exact method of application and test administration. Invite officers to your class to discuss procedures, answer questions, and describe the driver examination from their point of view. Take students on a field trip to the examining station during nonpeak hours (this, of course, should be arranged in conjunction with the examiners to avoid causing any disruption of normal routines).

Find out what you can do in preparing your students for the examination to make the role of the examiner easier with regard to handicapped students.

9. Parents

Get the parents involved.* Support from family members is very important for the handicapped driver. A positive attitude on the part of parents will reinforce the student's attitude that he or she can learn to drive, and this attitude might make the difference between success and failure in learning to drive. Knowledge that the parents will let the student use the family car after training and licensure are completed can be a motivating factor. Parents can also help the student practice maneuvers learned in class; extensive practice is especially important for the MMH student. The following are ideas for getting parents involved.

- Send information about the program activities home with the student.
- As class assignments, have students discuss their driver education goals, class progress, driving problems, attitudes about the use of the family car, or other topics with parents. Talk about the outcomes of these discussions in class. Involve students in planning ways to get their parents more involved.
- Have a visitors day in class. Let parents observe class activities.
- Talk to individual parents on the telephone or in person. Explain class goals and activities and the progress and problems of the individual student.
- Invite parents to ride along in the laboratory vehicle when the student is driving. (CAUTION: Check the implications for insurance coverage before this is done.) Explain how the parents can reinforce classroom and laboratory learning at home. Discuss with parents any differences between the laboratory car and the family car (e.g., what different or additional operations does the student have to do to operate the family car?).
- If the family car is appreciably different from the laboratory car, the teacher might arrange to have the family car available for the student to use one or more times for in-car instruction, in order to transfer skills.

*In light of P.L. 94-142, parents will necessarily be involved in the development of the Individualized Education Plan and so will have participated in the choice of driver education for the student (see Section 2 of this guide). This may be a starting point for subsequent involvement.

Scheduling Approaches

There are several ways of scheduling the MMH student into driver education classes. The following are some approaches which can be considered:

1. The MMH student is scheduled into the regular driver education classes with a special education teacher available as a resource person.

2. A special education class is taught driver education by a regular driver education teacher.

3. A special education class is taught driver education by a special education teacher who is also certified in driver education.

4. A special education version of driver education is taught by the special education teacher before the regular driver education program.

5. A special education version of driver education is taught by the special education teacher after the regular driver education program.[10]

Each of these approaches has advantages and disadvantages which need to be weighed carefully when planning a program. Some of the advantages and disadvantages of each are presented on the chart which follows.

The needs of individual students, as well as limitations of the school, availability of special education and driver education staff, scheduling restraints of the respective staff members, and other factors should be taken into account when selecting a scheduling approach. These approaches do not take into consideration the scheduling of laboratory experience which, ideally, should correlate with and support the academic portions of the course and should occur concurrently with the academic portions. Laboratory experience is discussed to some extent under "A Model for Scheduling."

[10] *Driver Education Programming*, Michigan Department of Education, pp. 34-35.

Approach	Advantages	Disadvantages
1. MMH student is scheduled into regular classes; special education teacher is available as a resource person.	a. MMH student could be motivated and helped by other students. b. Other students might profit from the strategies and activities planned for MMH student. c. MMH student might identify more closely in his or her achievements with the nonhandicapped students. d. Help of both teachers is available to the student. e. Special education teacher has access to course of study, textbooks, tests, and audiovisual equipment. f. Materials and concepts can be used as focus of study in other subject areas in the classes (e.g., using math to figure mileage, discussing driving laws in social studies, reading maps in geography).	a. In some districts, the handicapped student is now identified in the driver education class. No special consideration is given by either teacher. b. Additional driving experiences often are not available because of time limitations. c. Competition in classroom may intensify feelings of inadequacy in MMH students and cause subsequent withdrawal. d. Evaluation may be difficult for the driver education teacher not accustomed to working with MMH students. e. Opportunities for individual attention from the teacher are limited.
2. Regular driver education teacher teaches entire special education class.	a. The class is small, allowing for more individual attention and individualized pace. b. Materials and discussion can be geared to the students' level from the beginning.	a. Many driving instructors are not adequately trained in techniques of teaching mentally handicapped individuals. b. Students lose, or do not develop, identity with peer group in school.

Approach	Advantages	Disadvantages
	c. Lack of competition with nonhandicapped students produces more comfortable learning situation; this can lead to more self-expression.	c. Possible stimulus of regular classroom participation is not available.
	d. More field trips are possible because the class is small.	
	e. More driving time per student is available because class is small.	
	f. More individual attention is available because class is small.	
	g. Special education teacher is available for assistance.	
3. Special education class is taught by teacher certified in driver education.	a. Regular assignment for special education teacher eliminates financial loss for school that would occur if driver education teacher taught a small size class.	a. Special education teacher must be certified by the state to teach driver education.
	b. Classroom methods can be tailored for students.	b. Additional responsibility is put on teacher; some may not wish to or be able to take on extra duties.
	c. Teacher has better knowledge of individual student's abilities and needs.	c. Shortage of special education teachers might make it difficult to plan a consistent program.
	d. Problems of coordination are reduced because one person has the responsibility.	
	e. Material are integrated into other studies.	

Approach	Advantages	Disadvantages
	f. School district has one more certified teacher to carry the workload in driver education.	
	g. Classes can be flexible in scheduling to fit with regularly scheduled driver education.	
	h. Closer coordination with parents is possible.	
4. Special education version of driver education is taught before the regular driver education program.	a. Students are prepared for the driver education course and so get more out of it.	a. Competition in classroom might still cause feelings of inadequacy in MMH student, despite prior preparation.
	b. Because of prior preparation, students can perform with greater success and build confidence.	b. Evaluation might be difficult for the driver education teacher not accustomed to working with MMH students.
	c. MMH students could be motivated and helped by the other students.	c. Opportunities for individual attention from the driver education teacher are limited.
	d. Because of prior preparation, necessity for special instruction is reduced.	d. In some districts, the student is not identified in the driver education class. No special consideration is given.
	e. Special education teacher could be available to give special help to the student.	
	f. Driver education materials and concepts can be used as focus of study in other subject areas in the special education class.	

Approach	Advantages	Disadvantages
5. A special education version of driver education is taught after the regular driver education program.	a. Learning from the regular class is reinforced by the special education teacher. b. Intensive preparation for testing can take place in the special education class. c. Arrangements for delayed evaluation (after the special education component) can be made. d. Additional practice with materials and concepts can be given as needed. e. Misconceptions and fears of the student can be allayed in a nonthreatening atmosphere more conducive to self-expression. f. If used in combination with a special education class prior to regular driver education, the benefits multiply. The student is prepared for driver education instruction and has this learning reinforced afterward.	a. If concepts or habits are learned poorly or incorrectly during driver education class, it might be very difficult to correct them afterward. b. The special education teacher might be in the position of reteaching much of the driver education course if sufficient learning did not take place. c. If the student, from lack of preparation, does not learn enough from the driver education course to succeed in evaluation, feelings of failure and inadequacy might result. These in turn might impede progress in the special education class afterward.

A Model for Scheduling

One successful project using a combination of scheduling approaches was implemented in a program of the Montgomery County Schools.[11] This implementation, summarized below, utilized four "tracks" or instructional phases.

Project: STUDENTS Phase II Model for Driver Education for the Handicapped

Track	Intended for	Taught by	Description
1	MMH students who can be expected to succeed in traditional driver education classroom (10% to 15% of MMH population)	Driver education teacher	Classroom and laboratory instruction occur in a traditional setting. Special education teacher acts in a supportive role, providing additional instruction and reinforcement as necessary.
2	MMH students who cannot be expected to succeed on their own in a regular D.E. class (80% to 85% of MMH population)	Special education teacher presents most of academic portion of of driver education; driver education teacher acts in supporting role as required.	Classroom instruction occurs in special education setting. Because of teacher's knowledge of methods and techniques for teaching MMH students, this approach can be very effective, providing that the teacher understands the objectives and content of driver education. (NOTE: State Board of Education standards require that 36 hours of classroom driver education be taught by a certified driver education teacher. Therefore, it would be necessary either for the special education teacher to be certified in driver education or for a driver education teacher to provide 36 hours of the total number of hours of classroom instruction.)

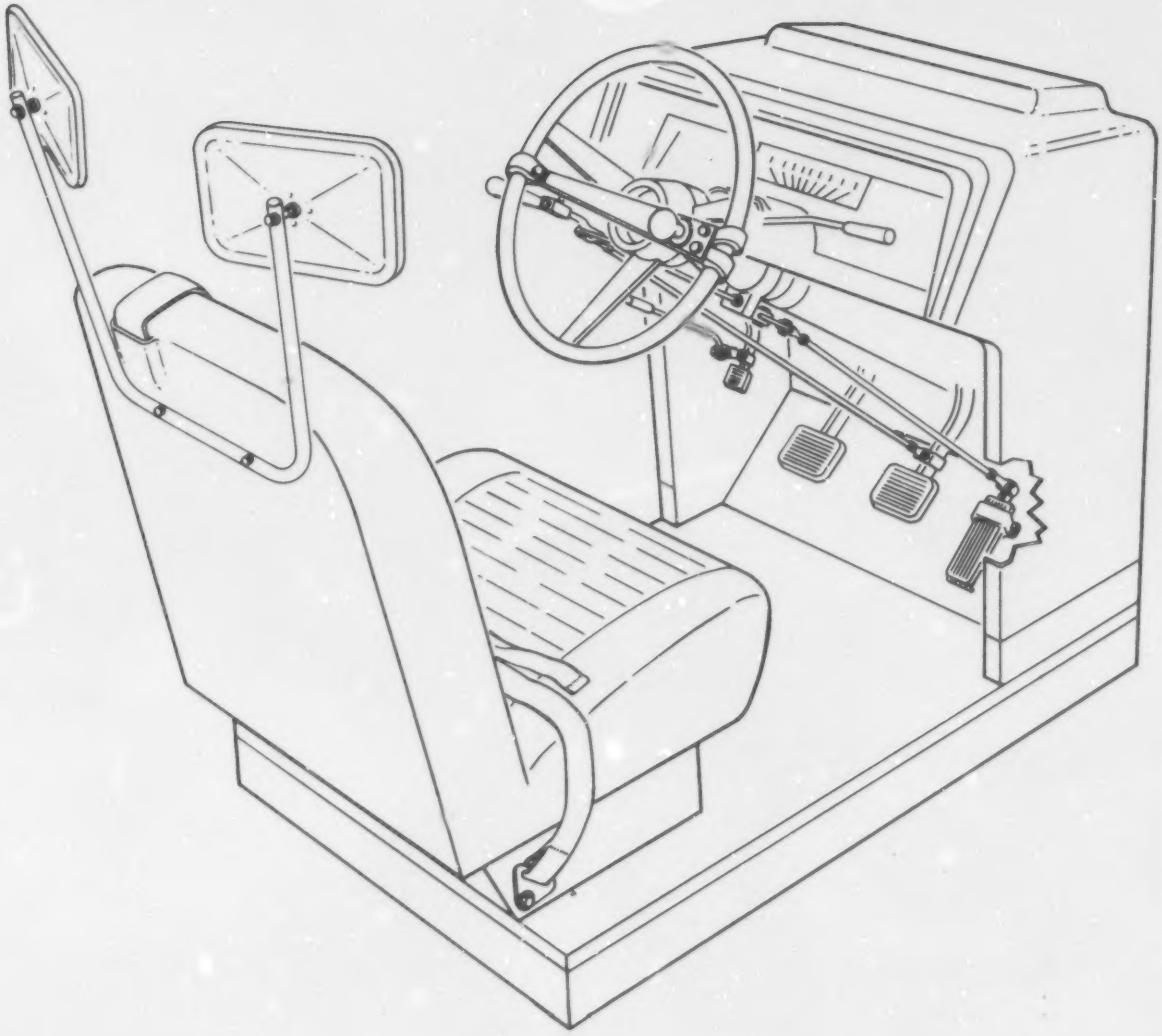
Classroom

continued

[11] *Project STUDENTS Phase II*. William T. Bolinger, Montgomery County Schools. ("Students" has an additional meaning in this project: Safety Training Using Driver Education Non-Traditional Systems.)

Laboratory

Track	Intended for	Taught by	Description
3	MMH students who have been able to obtain a temporary learner's permit	Driver education teacher	Behind-the-wheel instruction is provided for Track 2 students (see page 62). This should occur concurrently with Track 2.
4	MMH students who need extra practice in laboratory	Driver education teacher or special education teacher	Additional behind-the-wheel instruction is given as required. This additional practice can occur either concurrently with or after Track 3. This track can be the most difficult to manage in terms of staff and time.



Simulators

may be equipped with special equipment for special students.

5 SENSORY HANDICAPS

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Introduction

Among handicapped students who might receive driver education in the regular driver education classroom are the visually impaired and hearing impaired. According to figures projected by the Bureau of Education for the Handicapped, the incidence of hearing and visual impairment among children ages 6 to 18 is as follows: hearing impaired .575%[12] and visually impaired .10%.

Within these two groups there is the full range in degree of impairment. The hearing impaired include those with partial hearing loss (the "hard of hearing"), many of whom are assisted by hearing aids, as well as the profoundly deaf. Likewise, the visually impaired include the partially sighted as well as the blind (those whose sight is severely or totally impaired). Because, within both groups, individuals who have only slight impairment often function essentially as nonhandicapped learners, this discussion focuses primarily on the moderately and severely impaired.

[12]This figure includes .075% deaf and .50% hard of hearing.

Visually Impaired

The definition of blindness (for determination of eligibility for services to the blind) is generally 20/200 in the better eye with correction.[13] In simple terms, this means the person can see at 20 feet what a person with normal sight can see at 200 feet. Partial sight generally falls in the range of 20/70 to 20/200.

To pass the pre-examination for a driver's license in Ohio, in most instances the applicant should have at least 20/70 or better vision using one or both eyes, with or without correction. Depending on the actual vision, certain restrictions may be included. The standards in this area are very complex and may vary depending on the individual case. When there are students in the class with unusual vision impairments, contact the nearest driver examination station for clarification.

In some instances there may be students who could not become licensed drivers. Nevertheless, many aspects of driver education will be useful to all visually impaired students, both partially sighted and blind (generally less than 20/70).[14] For example, instruction in pedestrian and passenger safety is important for the personal safety of visually impaired persons who will be riding in other people's cars, using public transportation, or walking in the vicinity of roadways. Other topics, too, might be useful and interesting to visually impaired students — for example, traffic laws, automobile systems and maintenance, emergency situations, and effects of alcohol and other drugs on drivers. Passengers or pedestrians who are informed about the vehicle in which they are riding, about the highway system in which they are moving, and about the performance of the driver with whom they are riding are likely to be safer and more at ease than if they were uninformed. Therefore, visually impaired students should be included in the classroom phase of driver education whenever possible.

[13]The diameter of the visual field is also considered, and must subtend an angle of at least 20 degrees. For example, a person with tunnel vision — even if visual acuity within the restricted range is better than 20/200 — would be considered legally blind.

[14]Students with impaired vision who can be licensed to drive, would function in the classroom essentially as nonhandicapped students. Therefore, this group is not the subject of the information which follows. Rather, "visually impaired" refers here to those with less than 20/70 vision.

Areas of Need	Suggestions for Meeting Those Needs
1. Alternatives to Regular Reading Materials Many visually impaired students will have difficulty using driver education materials produced in standard print. For some of these students, using versions of the materials produced in alternative forms might be the best solution.	Inform the students as early as possible of texts and other readings for the course so that the student can inquire into the availability of braille or large print versions of the materials or "talking book" records and tapes. If the same materials are regularly used in the classroom and there is a listening center at the school, have the materials taped and put on file at the listening center for the students' convenience.
2. Low Vision Aids Some partially sighted students are able to read regular materials by using magnifiers and other low vision aids. Some can read printed materials by holding them very close to their eyes.	When handouts are used, be sure the print is clear and dark. There is some disagreement as to whether it is very helpful to the student to have materials produced in large print. For some students it undoubtedly is helpful. In some cases, however, the size of the print and the reduced amount of material on a page slows down the reading pace unnecessarily. If the school has the capacity for enlarging print in reproduction, ask the student whether regular or large size print would be preferable.
3. Note Taking Some students use a braille typewriter or a special slate and stylus to take notes during class. Many students tape record each class session for later review and study.	Whenever handouts, chalkboard notations, visual aids, demonstrations, or other sight-dependent techniques are used, give verbal explanations or descriptions along with them. At all times, be careful to enunciate and speak loudly enough, remembering that the visually impaired student does not have the advantage of lipreading, upon which most people depend to some degree.

Areas of Need	Suggestions for Meeting Those Needs
4. Readers Some visually impaired students employ readers who read required materials into a tape recorder. The student then listens to the recording when preparing assignments or reviewing material for tests.	Make all reading assignments and materials available to the student as early as possible. To keep abreast of the rest of the students, the student will need time to get the materials, transmit them to the reader, have them taped, get them back, and listen to them before the class for which they are assigned. Share lesson plans with the student at least a week in advance, if possible. If a student does not have a reader but could profit from such a service, consider having sighted students who are good readers perform this service on a volunteer basis. If none is available in the driver education class, a service-oriented club at the school might wish to accept this service as a club project.
5. Location in Class For most visually impaired students, the best location will be close to the instructor and the chalkboard or other visuals. In such a location the student with partial sight will be able to see better what is going on and the student who is tape recording will be able to get a clear recording with a minimum of distracting background noise.	Encourage visually impaired students to seat themselves in the most advantageous location for their needs. Encourage students to change their location in the classroom whenever the locus of instruction changes. Avoid changing the locus unnecessarily. For example, wandering across the room while lecturing could be avoided, so that the student doesn't continually have to readjust tape recorder volume.
6. Evaluation Some students will have difficulty taking a standard written test.	Tests can be handled in several ways, depending on the type of test and the degree of sight loss:

Areas of Need	Suggestions for Meeting Those Needs
	• Give oral quizzes to the entire class, in which the students respond to the questions by writing a brief answer or the letter of a multiple choice answer. Choices should be spoken as part of the question. • Dictate the questions to the visually impaired student in an individual session. If the test is the objective type, the student with severe sight loss might type the answers. If it is an essay test, the student might record the questions (by tape recording, typing, or braille writer), record the answers at home (by typing or tape recording), and turn them in later. Or, the student might simply answer the questions orally at the time the test is given. • Arrange for a reader to read the test questions to the student and record the student's answers. • Volunteer braille transcribers are sometimes available from service agencies for the blind. These are people who come to the school and transcribe the test into braille before it is administered so the student can take the test along with the rest of the class. If this service is used, find out from the agency how far in advance of the test the service must be requested. • If the student has enough sight to read large print and to write, it might be helpful to provide dark lead pencils or pens and wide-lined paper before the test. Discuss this with the student before doing it, or request that the student bring any such needed materials at the time of the test.

Hearing Impaired

Unlike visually impaired individuals, severely hearing impaired individuals do drive. In fact, as a group, they have been found to have a better driving record than their hearing counterparts. Good safe driving records of deaf drivers have been attributed to several reasons:

1. Over 97% of driving decisions are based on vision, not hearing.
2. Deaf drivers are free from the hypnotic effects of noises (like a humming motor).
3. Deaf drivers are free from noise distractions and can concentrate on the driving task.
4. Use of alcohol and other drugs is minimal among the deaf.
5. Having a handicap causes the deaf driver to remain alert while driving, to compensate for the impairment.
6. There is an *esprit de corps* among the deaf to keep their driving records clean (and thereby retain their driving rights as a group).[15]

Often, the only special requirement applied by licensing authorities is the installation of a full-range or convex rear view mirror and outside mirrors to help compensate for the inability to hear warning sounds (sirens, horns, screeching tires).

The primary problem in providing driver education to the deaf is that of communication. Once a system of communication between the instructor and the student is established — whether through manual communication (sign language), lipreading, use of interpreters, or other means — teaching a deaf student is essentially similar to teaching a hearing student. It should be noted, however, that — depending upon the time of the onset of deafness (before or after the development of other skills took place), the student's educational experience, and the student's degree of dependence on manual communication — the hearing impaired student may have special instructional needs. For example, difficult reading materials might pose a problem. Idiomatic or abstract language might also be problematic. The more concrete and straightforward the instructor's presentation, the easier it will be for the student or interpreter to interpret the instruction.

The following are some instructional needs of hearing impaired students and suggestions for meeting these needs in the classroom and laboratory phases of the regular driver education class.

[15]These views are presented by Judge Sherman Finesilver in "The Driving Records of Deaf Drivers," as cited in *Driver Education for the Handicapped: A Resource Curriculum in Driver Education Teacher Preparation*, Aaron and Kraemer, pp. 40-41.

In the Classroom Phase

Areas of Need	Suggestions for Meeting Those Needs
1. Position of the Instructor and Interpreter For the student who lipreads and the student who has an interpreter, the proper positioning of the instructor and the interpreter is extremely important to the student's ability to comprehend the lesson.	Face the student when speaking, whether or not an interpreter is present. Even when an interpreter is used, the student may combine reading sign language, reading lips, and watching the instructor's gestures. Obviously, for lips to be read, they must be seen. Position the interpreter correctly. The best placement is near — to the side and slightly behind — the instructor. (Most interpreters will position themselves automatically.) This makes it possible for the student to watch the interpreter and the instructor, who may be gesturing or using visual aids, without shifting focal area.
2. Instructor's Pace and Style When an interpreter is used, the instructor's pace and style will affect the ease or difficulty with which the interpreter performs his or her role. When no interpreter is used, the pace and style can be an important factor in the student's ability to comprehend the lesson.	Don't try to speak unnaturally slowly to make it easier for an interpreter to interpret your words; in most cases, the interpreter can sign as quickly as a person normally speaks. Trying to pace yourself to the interpreter will force the interpreter to slow down, probably in an uneven rhythm. This makes signing difficult to do and difficult to read. The important thing is to speak clearly and not to ramble. Occasionally, an interpreter might ask that a phrase be repeated, a technical term or proper name be spelled, or the rate of speech be slowed. Only then should you try to alter the normal presentation. Or, it might be helpful to meet with the interpreter after the first session and discuss any changes in pace or style that would make the interpreter's job easier.

Areas of Need	Suggestions for Meeting Those Needs
	Be sure you have the student's attention when you speak. If the student is absorbed in note taking or some other activity, this might require a small wave or nudge from a nearby classmate. Speak clearly but do not exaggerate your enunciation; a person who lipreads is used to reading normal speech, not exaggerated contortions of the mouth. Repetition is essential. Repeat important points in different ways. This will be helpful to hearing students as well.
3. Choice of Words Elaborate and unnecessary language make more work for the lipreader or interpreter. Use of unnecessary comments, asides, jargon, and other superfluous language complicates the task of the interpreter and the deaf student.	Avoid unnecessary language. Be as direct as possible. Finish your sentences. When there is more than one way to say something, choose the simpler way. (Compare, for example, these pairs of phrases: with respect to/about; in the event that/if; and despite the fact that/although.) In each case the shorter phase serves just as well. Avoid superfluous commentary, jargon, and other language that serves no real purpose. This does not mean that there is no place in the classroom for humor or color; it simply means that it is important to be economical in using language.
4. Class Atmosphere Students need to know that the instructor is interested in their full understanding of driver education and that full participation is welcomed in the class regardless of communicative impairment.	Encourage question and answer periods in class. Invite students to ask questions about lesson content, to request clarification of what has been said, to ask that you explain the meaning of a term you have used, and so on. Often, such clarifications will be helpful to everyone in the class. If the deaf student is not comfortable asking questions in class, invite the student personally to ask questions after class in individual question and answer sessions.

Areas of Need	Suggestions for Meeting Those Needs
5. Visual Aids The student who cannot depend on hearing as a main source of information must rely primarily on sight in the classroom. The instructor should find ways to enhance the visual aspects of each lesson, so that the students receive as much visual stimulation as possible.	Use visual aids whenever possible and appropriate. Prepared visuals, charts or sketches on the chalkboard, demonstrations, and even informative gestures are helpful to the deaf student (and to other students). It should be remembered, however, that slides, transparencies, or overheads that require verbal commentary in a darkened room will be less successful. The student either will not be able to see the instructor or interpreter in the darkened room or will not be able both to examine the visual and to "hear" the commentary at the same time. If possible, print any necessary commentary right on the visual or provide a printed script (before the visuals if possible). If these techniques make the pace too slow, it may be preferable to try other strategies altogether. Use captioned films. These are standard, narrated films to which printed captions have been added. Many are available through: Captioned Films for the Deaf Bureau of Education for the Handicapped U.S. Office of Education Washington, DC 20202 Captioned simulator films are available from some manufacturers of simulators. When using captioned films, some instructors find it helpful to use such techniques as the following: • Show the film at slow speed. • Show the film twice — first with the sound on and no interruptions, then standing by the screen and interrupting for explanation and discussion.

Areas of Need	Suggestions for Meeting Those Needs
	• Keep lights on in the classroom. • Supplement the film with chalkboard explanations. Commercial movies, filmstrips, and slides sometimes can be used effectively with deaf students. Information about such products is available from: The Alexander Graham Bell Association for the Deaf, Inc. 3417 Volta Place, N.W. Washington, DC 20007 When showing films for which captioned versions are not available, provide printed scripts (before the projection) or, if an interpreter is present, have enough light in the room so that the student can see the interpreter. Use sign language videotapes with individual students (during free periods, after school, or through a listening center). A list of pertinent videotapes is provided in Appendix B. If you have statistics, facts, lists, or other materials the students are expected to record, accompany the verbal presentation with a printed handout. If you expect the students to read the handout immediately, allow time for this before continuing verbally. Remember, it is difficult for the deaf student to read and listen at the same time. As with many of these techniques, providing handouts may be helpful to the hearing students as well, enabling them to really listen to your explanations rather than concentrating on notetaking. Have students copy information from the chalkboard. This helps them to internalize it while they write.

Areas of Need	Suggestions for Meeting Those Needs
6. Vocabulary While hearing students learn much of their vocabulary by hearing words used in context, deaf students are limited in the amount of conversation they casually pick up. Thus, by the time they reach high school, most hearing students have larger vocabularies than deaf students. Therefore, it will be helpful to teach the vocabulary needed for each lesson.	Teaching the vocabulary for a lesson can be done in several ways: • Write words and definitions on the chalkboard before class, then point to or circle each word when it is used in the lesson. • Prepare vocabulary handouts and give them out at the end of the preceding lesson. • Prepare flash cards for each lesson and give them to the deaf students at the end of the preceding class session (to be returned to the instructor) so the student can practice with the vocabulary at home. • Spend a few minutes at the beginning of each lesson teaching vocabulary for that day's lesson. Teaching vocabulary is particularly important in preparing the student for taking the written portion of the driver examination. This is discussed further in number 8. Don't let vocabulary become a barrier to successful performance on evaluations. Avoid introducing unfamiliar vocabulary on tests. Define any difficult new words you can't avoid using. Encourage students to ask for clarification of any words they don't know.

Areas of Need	Suggestions for Meeting Those Needs
7. Choice of Teaching Strategies Deaf students learn best through experience with real situations, objects, and pictures. Variety in teaching strategies can also enhance learning and interest level.	The following are a few examples of alternative teaching strategies that can be effective: • Use active, participatory classroom strategies whenever possible. • Use real objects, demonstrations, and pictures to enhance explanations. • Try to organize content so that each activity or topic calls upon both conceptual skills and psychomotor skills. • Use role play to teach maneuvers and concepts. For example, set up traffic configurations in an open space and have students walk through them using chairs.
8. Preparation for the Driver Examination Many students will need specific preparation in how to take the driver examination so that the test situation itself is not a barrier to success.	Section 7 of this guide provides a description of procedures followed for the Ohio driver examination. Additional information can be obtained from the local examining station regarding scheduling and local approaches to the examination process. Based on all information available, inform the students what to expect and teach them to take this type of examination. Give sample tests administered exactly as the driver examination will be administered. Have students practice taking such tests until they are comfortable with the procedures.

Areas of Need	Suggestions for Meeting Those Needs

acceleration
address
adverse
allowable
applicants
approaching
audible
bulges
centerline
chauffeur
conditions
continue
emergency
entirely
gradually
hydrant
ignition
illumination
immediately
improved
inability
incorrect
injured
intersection
involved
manslaughter
minimum
municipalities
neutral
occupant
operator
opposite
overdriving
overtake
permissible
portion
procession
providing
reaction
refuse
registrar
revoked
signalled
suspended
travelling
vehicle[16]

Teaching vocabulary will probably be necessary before the pre-examination. To the left is a box of multisyllable words currently used in the pre-examination. While a deaf student might very well know some of these words, the assumption should not be made that, because a word is common to a hearing student, it is common to a deaf student. Pretests will help determine how much vocabulary development is required.

The following are suggestions for building vocabulary:

- Start building vocabulary early in the course.
- Build vocabulary gradually by using increasingly difficult words on tests.
- Retest in different ways.
- Re-administer the last several tests a few days before the pre-examination.
- Remove pressure (such as time limits) from test situations so that anxiety doesn't detract from their learning value.

9. Parent Involvement

Support from family members is essential for the handicapped student. Involve the parents whenever possible.

[16]Compiled by staff at the Grace A. Greene Vocational Center, Dayton City Schools, Dayton, Ohio.

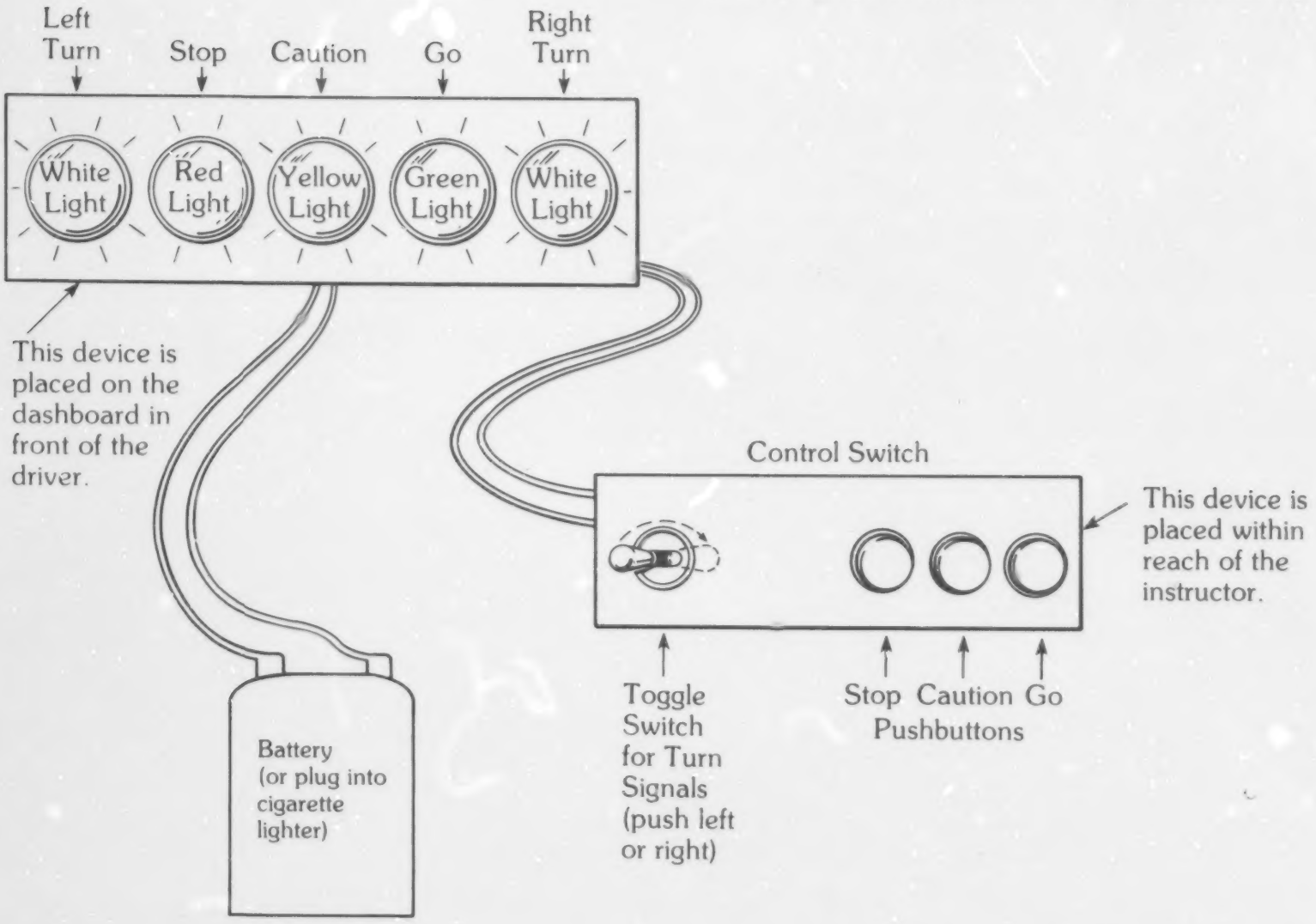
In the Laboratory Phase

Areas of Need	Suggestions for Meeting Those Needs
1. Use of Simulators Use of simulators can provide valuable learning and practice for the deaf student. Use of this medium with deaf students might require a somewhat different approach by the instructor than when using it with hearing students.	Use of the automatic incorrect response code might not be possible with deaf students. A program in Massachusetts offered this description of its experience in this area: > Students trained on simulators were divided into two groups, deaf and other than deaf. The deaf students could not be trained with the automatic incorrect response code because of their inability to hear the narrator's directions and, thus, respond within the time allowed. This meant that a Student Film Analysis Chart could not be used for each film on the simulator. Deaf students were evaluated on their demonstrated performance such as steering, braking, speed control, acceleration, signaling, and use of mirrors (both outside and inside).[17] Focus on use of simulator films for giving the student practice in the kinds of skills listed above. To provide feedback on performance, either stop the film to get the student's attention and then make the comments (this works best in an individual situation) or save commentary for the end of the film. If narrated simulator films are used to teach new driving concepts, an interpreter (standing close to the screen) might be used. (This, however, can be distracting to both deaf and hearing students who are trying to concentrate on the depicted road situation.) If this approach is used, the student's responses to the narrator's instructions relayed by the interpreter should not be timed.

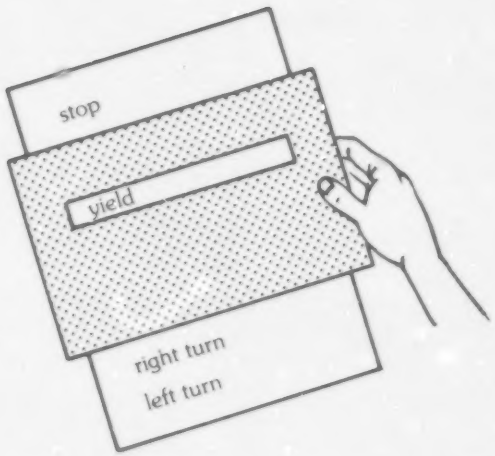
[17] *Instructor's Manual for Driver Education of the Physically & Multiply Handicapped Person*. Easter Seal Society for Crippled Children & Adults of Massachusetts, Inc., p. 29.

Areas of Need	Suggestions for Meeting Those Needs
	Giving the deaf student a script of the film narration to study before the film can also be helpful. As much as possible, use captioned films for simulators. These are available from some manufacturers of simulators.
2. Means of In-car Instruction The most important consideration in the behind-the-wheel phase of driver education will be finding a suitable (and quick) means of communication with the student. Presence of an interpreter in the instructional car would be difficult and is not permitted during the driver examination.	The following are ideas for communication during in-car instruction: • Hand signs seem to be the best method of giving directions to the profoundly deaf student. The signs must be quick and understood by both the instructor and the student before the lesson begins. • Mechanical devices, while less desirable, can work for frequently used instructions such as turns, go, stop, and caution. One such device is pictured on the following page. The device can be used only to give a few specific directions; any clarification needed by the student will require some other form of communication by the instructor.

Mechanical Device for In-car Instruction



Areas of Need	Suggestions for Meeting Those Needs



- Printed materials are another option. A few suggestions are given below.

  Flash cards would be the least acceptable method of using printed materials because of the time involved in finding, showing, and reading cards.

  Charts and maps of the route to be driven could be studied in advance and pointed to during instruction.

  A list of instructions printed on a single page could be used with a cut-out screen (see illustration). Using this technique, one instruction at a time shows through the cut-out.

  A note pad on which to write down particular problems is best used while stopped or parked.

  There are also commercially printed materials which can be purchased for illustrating different driving situations.

- Immediate discussion is a very useful technique. When a problem occurs, the instructor signals "right," the student pulls to the curb and stops, and the problem is discussed.

- Physical action may often be the clearest way of communicating with the student — especially the beginner. The instructor simply takes the wheel to make lane position adjustments, to avoid hitting a curb, or to demonstrate other needed changes. The student should know to expect this kind of intervention from time to time.

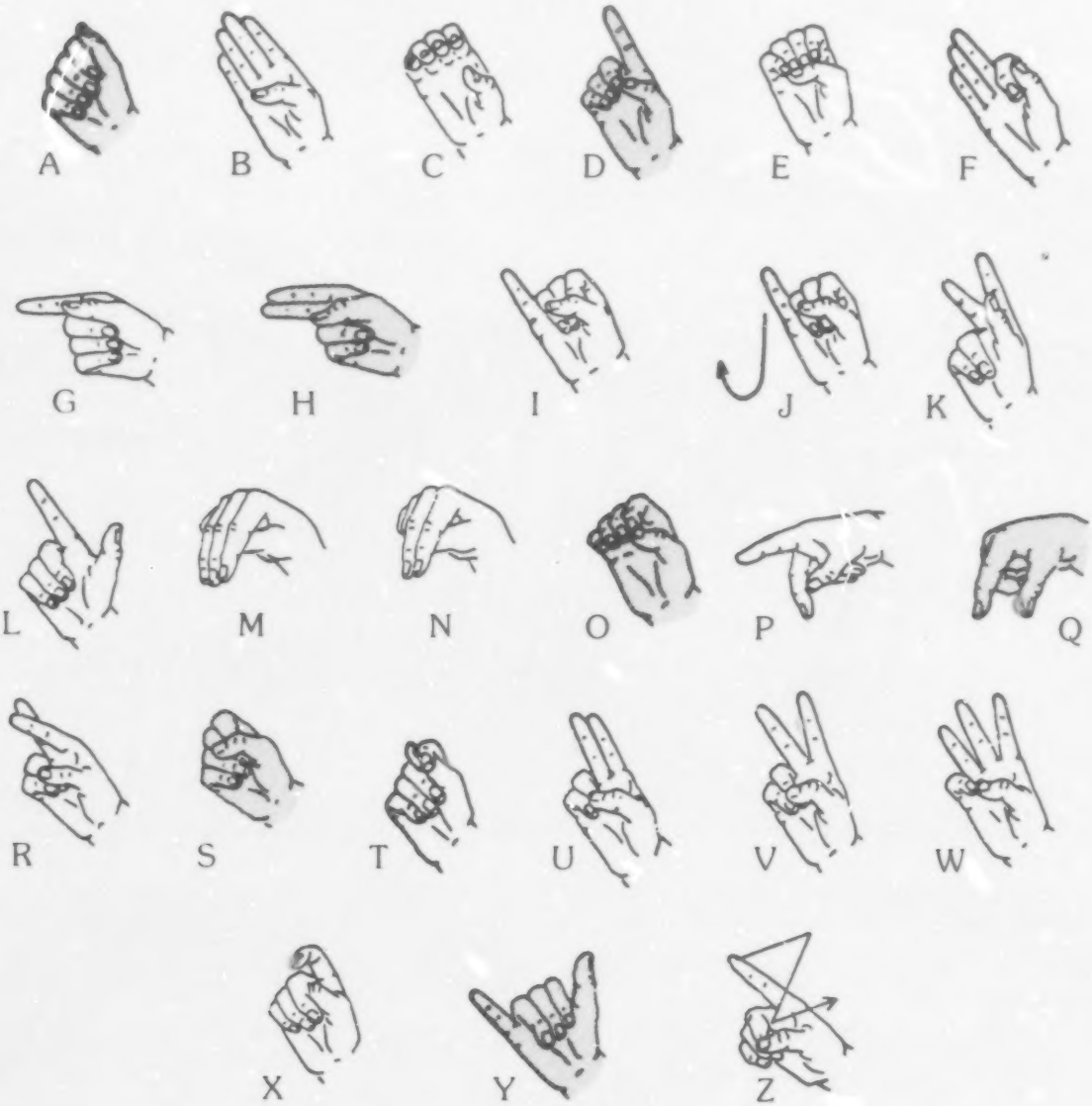
Areas of Need	Suggestions for Meeting Those Needs
3. Use of Sign Language	If you decide to use hand signs in in-car instruction, there are a few essential manual communication (sign language and manual alphabet) signs that should be learned: park(P) reverse (R) neutral (N) drive (D) low (L) start look stop go left turn right turn stay fast pass slow yes no good light move to left lane move to right lane number signs (for speed limits, number of lanes to move, and number of streets before turning)[18] These basic signs are illustrated and described on the following pages. Demonstrate each sign and its meaning and practice the signs with the student before beginning in-car instruction so there is a clear understanding of what is meant by each. Expect use of signs to be somewhat frustrating, especially at first. When a situation becomes tense, your instinct will be to react verbally and your recall of signs may suddenly disappear. As with any "foreign language," use of sign language becomes easy and natural only with practice.

[18]List suggested in *Driver Education – Special Education Unit: Deaf*. Miami University. Dr. Bob Shrader. p. 2. (modified for use in this guide).

Manual Alphabet Used by the Deaf in North America[19]

Letters in the manual alphabet are always made with the palm facing the listener. Each letter should be made distinctly and separately.

Although you might need to use only "P," "R," "N," "D," and "L," the entire alphabet is shown here because references to these positions are given in the directions for some of the signs which follow.



[19]Illustrations are taken from *Talk to the Deaf*, Lottie L. Riekehof.

Signs for Gear Selection

Park P

Reverse R

Neutral N

Drive D

Low L

Other letters can be arranged between you and the student to stand for specific directions. For example, a "W" moved left and right in an arc might be designated to mean windshield wiper during in-car instruction.

Other Signs[20]

Begin, start

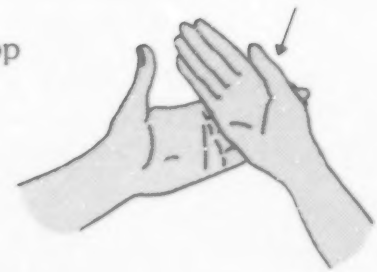
Using the tip of the right index finger, make a half-turn between the index and middle fingers of the left open hand (indicating a screw or a key being turned).

[20]Illustrations for all following signs (except "stay," "left turn," "right turn," "move to left lane," and "move to right lane") are from *A Basic Course in Manual Communication*, Terrence J. O'Rourke, National Association for the Deaf. Portions of the descriptions are from *Talk to the Deaf*.

Look at, watch

Place "V" near the eyes, pointing outward from face; move "V" forward (indicating eyes looking out).

Stop



Bring the little finger side of the right open hand down sharply to a position across the left open palm (indicating a barrier).

Go

Rotate index fingers around each other as they move forward (palms toward self).

Left turn

Point "L" hand toward the left (index finger and thumb extended; other fingers closed against palm). See manual alphabet "L."

Right turn

Point "R" hand toward the right (second finger slightly crossing index finger; thumb holding other two fingers toward palm). See manual alphabet "R."

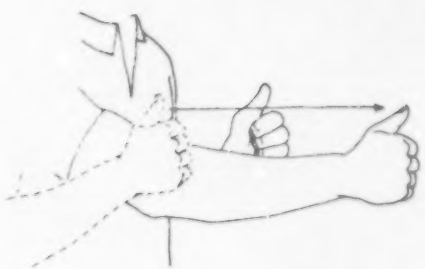
Stay

Place the thumb of the right "A" on the thumbnail of the left "A" and push downward slightly.

Fast, quick

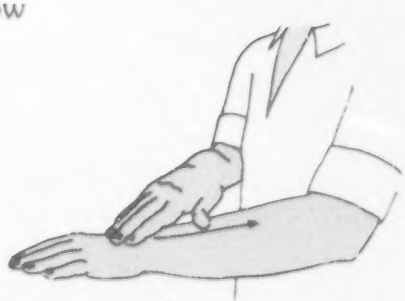
Snap the right thumb out of the curved index finger as if shooting a marble. Move wrist downward during the motion.

Pass



Move the right "A" forward past the left "A."

Slow



Stroke down the back of the left hand slowly with the right hand.

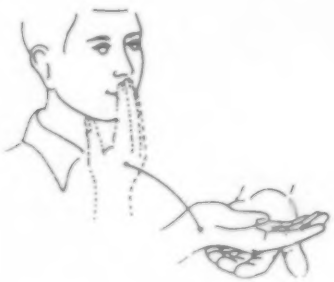
Yes

Hold the "S" hand before you, palm facing out, and bend the wrist forward. Repeat motion for emphasis.

No

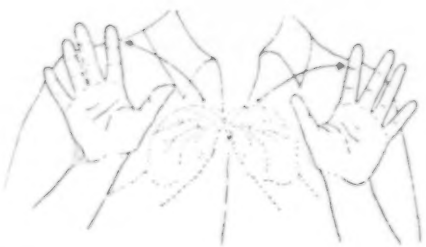
Make an abbreviated "N" and "O" by bringing the index, middle finger, and thumb together in one motion.

Good



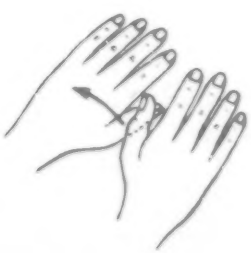
Touch the lips with the fingers of the right hand and then move the right hand forward, placing it (palm up) in the palm of the left hand.

Light



Point both hands outward, fingers touching thumbs and index fingers together; open fingers as hands move upward and to the side (ending in "5" position), palms facing forward.

Move to left lane



Place hands next to each other, palms down and parallel. Move right hand over on top of left hand.

Move to right lane

Place hands next to each other, palms down and parallel. Move left hand over on top of right hand.

Numbers

These illustrations indicate how the signs look to the listener (not the signer). Combination numbers are formed as illustrated for 21 through 23. For example, 55 would be formed by signing the "5" of "50" (open palm forward, five fingers extended) then moving that "5" slightly to the left to indicate another "5" being made.

1

2

3

4

5

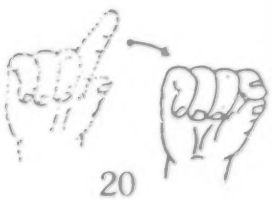
6

7

8

9

10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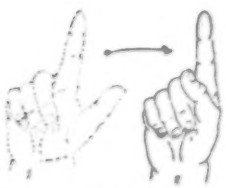
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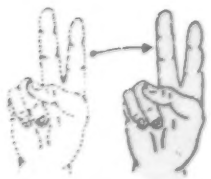
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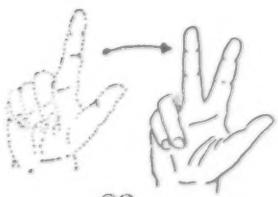
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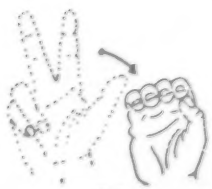
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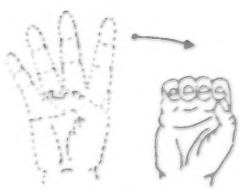
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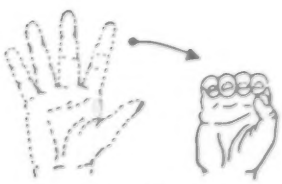
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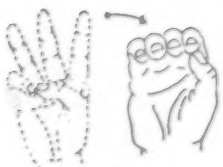
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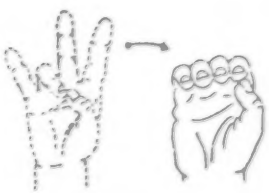
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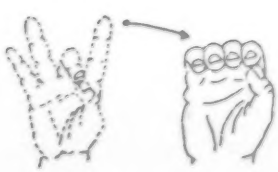
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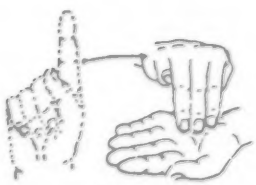
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6 PHYSICAL HANDICAPS

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Introduction

For a person with a physical handicap, driver education is imperative. The fact that driver education for the handicapped has not been generally available constitutes a significant problem in our society today. Our emphasis on mobility and the general inadequacy of our public transportation systems result in an inordinate hardship for those who cannot drive.

Learning to drive a car is an important step in the life adjustment process for the physically impaired, whether the handicap was sustained at birth or later. Just as learning or relearning how to take care of personal needs, to dress, and to move about under their own power are steps toward independence for handicapped individuals, learning or relearning to drive can provide handicapped people with better opportunities to obtain work and to pursue an education. Not only does driving provide physical access to potential jobs, but the fact that a handicapped person can drive often makes a very positive impression on potential employers. Moreover, the psychological and social benefits of increased mobility for the person who is handicapped are considerable.

There are many different kinds of physical handicap, affecting different parts of the body — or combinations of those parts — in different ways. Even within a given type of physical impairment — say, amputation of the right arm above the elbow — no two individuals are alike. The instructor must take care with physically handicapped students, as with the other groups discussed in this guide, not to generalize about the abilities or driving potential of any individual based strictly on a medical diagnosis or observable symptoms. For the physically disabled, motivation and practice are often the most important factors in learning to drive.

The Physically Handicapped Student

The first consideration in preparing to teach the physically handicapped is definition: who are the physically handicapped?

In this guide, many types of physical impairment are described, with emphasis on the implications of the impairment for learning to drive a car. Only the most common disabilities (in terms of the likelihood of their appearing in the driver education class) are included here; there are many others that are not included, for the sake of keeping this guide to a practical length.

One way of beginning to understand the dimensions of this large population is to distinguish between those disabilities involving brain damage and those not involving brain damage.[21] There are other ways to group disabilities which are just as useful (or more useful for other purposes) as this one. The rationale for choosing this type of distinction is that brain damage may indicate intellectual, perceptual, psychomotor, or behavioral symptoms that will have different implications for the driving task than the symptoms that are strictly physiological in nature.

This guide includes brief discussions of the following disabilities:

Not involving brain damage

- amputation
- spinal cord injury
- miscellaneous orthopedic disorders, including:
  - — contractures following burns
  - — poor bone alignment following fractures
  - — arthritis
- pulmonary diseases
- cardiac diseases
- diseases affecting the muscles, including:
  - — amyotrophic lateral sclerosis
  - — muscular dystrophy
  - — Guillain-Barré Syndrome
  - — multiple sclerosis

Involving brain damage

- left hemiplegia
- right hemiplegia
- head trauma
- cerebral palsy

[21] This distinction has been used in *Driving for the Physically Handicapped*. Department of Occupational Therapy. Rancho Los Amigos Hospital. That document also contributed to the discussions of disabilities which follow.

Disabilities are discussed primarily in terms of their symptoms, especially as they relate to the driving task. In addition to the discussions in this section of the guide, a booklet, "Physical Handicap Summaries" accompanies this guide. This booklet is made up of reference cards, one for each symptom, on which are listed causes of the symptom, effects on the driving task, and implications for driver education such as necessary assistive devices and instructional strategies. The instructor is encouraged to use that reference both in conjunction with the text in the guide and as a handy reference tool whenever needed. The reference cards may, if desired, be detached from the binder and used as separate file cards.

Congenital vs. Acquired Disabilities

In assessing the needs of the individual student, it is often helpful to consider whether the disorder is congenital (existing at birth) or adventitious (acquired after birth). The driving task is more than the mechanical manipulation of a vehicle through space; it is also a social skill. Therefore, the social and emotional maturity of the individual is important in learning driving skills. Part of social and emotional maturation is the development of the ability to make decisions under risk conditions. The capacity for this type of development may be influenced by whether the student's disorder is congenital or acquired, as discussed below.

Congenital disorders. The individual with a congenital disorder often has led a sheltered life, having had few opportunities to develop social skills or to make risk decisions. These are factors to which the instructor must be sensitive. For example, the student might need a great deal of encouragement in the pursuit of independence or might require gentle insistence from the instructor that the student can develop the capacity to enter and leave the car independently.

Acquired disorders. For the individual with an acquired disability, social maturity and decision making often are not the major problems. Rather, an acquired disability often requires that the individual adjust to a modified body because the old concepts of identity and body image no longer hold. The person whose self-concept is hinged upon being an athlete or dancer or on fulfilling another role indicative of physical skill must reevaluate this self-concept, reassess strengths and weaknesses, and come up with a new and realistic self-concept. It is felt by some authorities that the person with an acquired disability never totally accepts this limitation and, in fact, must readjust constantly to the disability throughout life.

Specific Disabilities

The following discussions are not intended to provide full clinical detail of any disability or to describe all possible variations. Rather, they strive to give the person who lacks information about physical handicaps a better understanding of how such handicaps might affect teaching the individual to drive. More detailed information should be obtained from medical or therapeutic specialists.

Again, the teacher must be cautioned to avoid generalizing about students or prejudging their potential on the basis of this information. Give the student a chance to surpass your expectations. Additionally, be alert for multiple handicaps. While these disabilities are discussed singly, they may occur in combination with other physical, mental, or sensorial disabilities.

Card citations in the left column refer to related cards in the booklet, "Physical Handicap Summaries."

1. Amputation

Amputations generally are the result of either an accident or medical condition. This distinction is important for instruction in that individuals with medical conditions (such as circulatory problems) which necessitated amputation may, in a few cases, have related problems of weakness, slow reaction time, or even impaired judgment in severe cases, whereas injury related amputations generally are not accompanied by these problems. Amputations can involve one or both legs and one or both arms. The level of the amputation (what portion of the limb has been removed) will affect the person's degree of potential use of the limb.

Prosthetic devices (artificial limbs) are often fitted to the person to restore some degree of functioning.[22]

Amputations involving the legs. A major problem for the lower extremity amputee is body balance. The higher the amputation, the greater the problem. If the amputee has a prosthesis, he or she should wear it during driving lessons to improve balance (but not to operate foot controls!). Care must then be taken that the device does not interfere with the foot pedals. Safety restraints of the chest or shoulder type and arm rests or contour cushions are also helpful for balance.

If only one leg is affected (this is called unilateral amputation), the driver will be able to drive with the other leg. The left leg amputee will require a hand dimmer switch and hand operated parking brake. The right leg amputee will require an adaption of the accelerator to the left of the brake, enabling the person to operate the brake and accelerator with the left foot. A hand dimmer switch, while not absolutely essential, would be most practical.

See Cards 1 and 2.

[22]Technological advances in prostheses are being made so rapidly that mechanisms presently in the research stage may be available to individuals in just a few years. It is likely to become possible to restore far more functioning than is now possible. Future users of this information should be guided by the student's demonstrated functioning ability when it exceeds that which is described here.

If both legs are affected (bilateral amputation), the driver will require all hand operated controls, including brake, accelerator, dimmer switch, and parking brake. Automatic transmission is a must for all leg amputees.

See Cards 1, 2, 3, and 4.

Amputations involving the arms. Most arm amputees will have only one arm affected, and many will have a prosthetic device on the affected arm. This will allow the student to steer with one arm (preferably the sound arm) and perform other functions with the other (preferably the prosthesis).

The lower the level of amputation, the greater the functional range of the affected arm will be. In simplest terms, the level of amputation may be differentiated as above elbow or below elbow. If below elbow, the affected arm can be used for steering if a steering ring is mounted on the steering wheel. If above elbow, the student probably will be unable to steer with the affected arm because of lack of intrinsic muscular action to complete a circular motion. Depending on the side and the level of amputation, right or left hand adaptations of control levers may be required. Rings may need to be attached to dashboard controls and other small control devices.

See Cards 5, 6, 8, and 9.

If both arms are affected, the same rule of above or below elbow applies. At least one arm below the elbow usually is necessary for steering. A person with two below elbow amputations can drive with the kinds of adaptations mentioned above. A person with one below elbow and one above elbow amputation can drive with similar adaptations. But a person with two above elbow amputations in most cases will not be able to steer reliably with either arm, and will require foot operated steering. The most common form of foot steering is a metal boot mounted on a steering disk for the left foot. The right foot then operates the brake and accelerator as usual.

See Cards 7, 10, and 11.

2. Spinal Cord Injury

Spinal cord injury implies that the cause of the disability has been a physical injury and that, unless there are other complications, the student's mental abilities are normal. While spinal cord injury is not

progressive, it is usually permanent and irreversible. Spinal cord injuries generally result in a loss or reduction of active motion below the point of injury and, in some cases, a loss of sensation and a loss of bowel and bladder control. There are two major types of spinal cord injury, described below.

Paraplegia, generally including paralysis of both legs and the lower trunk, results from a spinal cord injury at the level of the chest or lower back. If the involved areas are not paralyzed, but are greatly weakened, the condition is called paraparesis. Driver education for students in this group will involve adaptations similar to those described for bilateral leg amputees.

See Card 3.

Quadriplegia, generally including paralysis of both legs, both arms, and the trunk, results from a spinal cord injury at the level of the neck. If the involved areas are not paralyzed but are greatly weakened, the condition is called quadriparesis. Driver education adaptations will be quite extensive and will depend on the person's residual strength and degree of control in various limbs. Often, a custom designed van which can be driven from a wheelchair and which has a power lift is the best alternative for the quadriplegic driver.

Fatigue will be a factor with the quadriplegic student, as will the danger of skin pressure from remaining in one position too long. Driving lessons will have to be planned with awareness of the student's stamina, and the instructor should instruct the student in the importance of recognizing endurance limitations in planning driving trips and of recognizing impending fatigue before it affects the driver's skill. Balance will be a problem also, and will require safety restraints of the chest or shoulder type and arm rests or contour cushions as necessary.

See Card 13.

3. Miscellaneous Disorders Classed by Major Symptoms

   A. Lack of Range of Motion

      Primary causes of this symptom include:

      1. contractures following severe burns

2. poor bone alignment following fractures

3. arthritis

Other causes include various birth defects, growth disorders, medical conditions such as hemophilia, and others. Neither contracture nor poor bone alignment is progressive, but they are often permanent. Arthritis in its major forms is chronic, debilitating, long-term, and frequently progressive.

In relation to the driving task, the most serious problems of lack of range of motion occur when the shoulders are involved. The problems are less serious when only the neck or portions of the arms are involved. Depending upon the seriousness of the disability, adaptations for lack of range of shoulder motion may range from minor adjustments, such as adjustable or smaller diameter steering wheel, to adaptations similar to those described for bilateral arm amputees. Adaptations for hip disorders may vary as well. Lack of range of motion in the neck area may require only the use of special rear and side view mirrors. Where only the hands or wrists are involved, steering devices may be sufficient.

See Cards 14, 15, 16, and 17.

B. Poor Endurance

Primary causes of poor endurance include:

1. pulmonary (lung) diseases

2. cardiac (heart) diseases

Other causes include multiple sclerosis, muscular dystrophy, amytrophic lateral sclerosis (all described below under "Muscle Weakness"), and spinal cord injury.

See Card 22.

Both pulmonary and cardiac patients fatigue very easily. The instructor should take this into account when planning driving lessons and should make the student aware of the importance of limiting driving time in accordance with individual endurance.

The driver with a pulmonary disease may need to have oxygen on hand at all times. This driver must be able to transfer the oxygen equipment in and out of the car.

It is recommended that when the beginning cardiac driver is being screened and evaluated, cardiac monitoring equipment be used to determine whether the student can handle the stress incured while driving a car.

C. Muscle Weakness

Major causes of general muscle weakness include:

1. amyotrophic lateral sclerosis
2. muscular dystrophy
3. Guillain-Barré
4. multiple sclerosis

Cerebral palsy and quadriparesis are also causes of muscle weakness, as are some adrenal disorders, spina bifida, and other disabilities. These neuromuscular disorders cause progressive weakening of the muscles, loss of sensation, and fatigue.

Amyotrophic lateral sclerosis generally occurs between the ages of forty and sixty. Some visual distortion may be present but severe effects on the sight and hearing are usually not found.

Muscular dystrophy is also progressive, usually beginning in the legs and gradually involving the knees, the hips, and the rest of the body.

Guillain-Barré is characterized by extreme muscle weakness which may progress to paralysis, endangering the person's life. This disease, however, frequently reverses itself, with no permanent residual muscle weakness.

Multiple sclerosis usually strikes between the ages of twenty and forty, producing some paralysis and loss of sensation and, in some cases, affecting vision, speech, and balance. Perception problems and double vision may occur, especially when the person is fatigued. The individual may experience periods of remission, when symptoms seem to subside. Each active period of the disease, however, leaves additional permanent debilitation. The instructor should also be aware that occasionally persons with multiple sclerosis sustain brain damage.

Adaptations for driving will depend upon the nature and degree of disability and the limbs affected. In any case, power steering, power brakes, and automatic transmission are minimum requirements to avoid excessive fatigue. Students with progressive disorders should be instructed in the range of equipment and professional assistance available so they will be prepared to seek additional assistance to compensate for decreasing ability to drive as the disorder progresses.

See Cards 20, 21, and 12.

Disabilities Involving Brain Damage

It is the brain that regulates and coordinates the body's activities. Considering the complexity of the human brain — and therefore, the complexities of the various disabilities — one can understand why a considerable variety of manifestations exist and why any given disorder varies greatly from one person to another. This discussion considers the six major types of symptoms associated with brain damage and four of the most common disabilities which involve those symptoms.

The symptoms described below can occur in any combination and to any degree of severity. Since some symptoms might show up only under stress, it is important that the student be evaluated under all traffic conditions, including stressful ones. This extreme variability also extends to the effects of time on the disability. Sometimes, in situations where the disability has only recently been acquired, the effects of the disability will be too severe to allow participation in driver education but there will be a marked difference, often an improvement, after the passage of six months or a year. In such cases, the student would be wise to return for a second assessment after a period of time has elapsed.

1. Symptoms Associated with Brain Damage

   A. Lapses of Consciousness

      This symptom may occur among individuals with:

      1. epilepsy
      2. cerebral palsy
      3. other convulsive disorders

      Diabetes and cardiac diseases can also cause lapses of consciousness.

      By law, persons with this symptom cannot drive unless their condition has been satisfactorily medically controlled. Each case is individually considered by the state in deciding whether the individual shall be permitted to drive and what licensing restrictions, if any, shall be imposed.

   B. Neuromotor Symptoms

      Generally, these symptoms are characterized by poor muscle control. They can affect any number and any combination of muscles. There are several ways in which these neuromotor disorders are manifested:

      1. flaccidity (no muscle activity at all)

See Card 23.

2. spasticity (too much muscle activity)

3. athetosis (involuntary movement)

4. rigidity (slow muscular response)

5. hyperactive reflexes (loss of motor control in response to certain stimuli)

Do not prejudge the ability of individuals with neuromotor disorders to drive. Motivation and practice have enabled many of these individuals to learn how to drive successfully.

See Cards 12 and 21.

C. Intellectual Symptoms

As discussed in the section on mild mental handicaps, the instructor who has an intellectually disabled student needs to work closely with a professional who is trained to deal with the problems of the intellectually disabled. Remember, however, that the person who has intellectual symptoms associated with brain damage is not necessarily mentally handicapped or of lower intelligence. To the contrary, many of these students may have above average intelligence. Reference to the section on mild mental handicaps is made here because these groups may share some accompanying symptoms.

Patience is imperative. Persons who experience difficulty with learning are not necessarily unable to learn; rather, the appropriate avenues must be found to enable them to learn. The time, care, and concern of the instructor will make the difference in this situation.

D. Neurosensory Symptoms

Neurosensory symptoms concern the five major senses, especially vision and hearing which were discussed earlier. There are a number of visual problems that can result from brain damage, which might not be apparent in the vision test administered by the state. Examples

of such symptoms include double vision, confusion in the visual field, blind spots in the visual field, and poorly established eye dominance. These symptoms can affect the student's ability to learn to drive. With proper training, some students can learn to compensate for visual distortions.

The driver education program for handicapped students should evaluate vision as part of the screening and assessment process. The instructor needs to work closely with a physician, psychologist, or therapist in order to understand how some of these problems affect the driving task and how the student might be taught to compensate, if possible for visual deficits.

E. Perceptual Symptoms

Perceptual dysfunctions are highly variable. They may include such problems as difficulty perceiving where and how one's body (and therefore one's car) is positioned in space, difficulty distinguishing objects from background, and many others. Often, the medical community will be unable to define the problem precisely or to identify its relationship to the driving task. Paper and pencil perceptual tests frequently do not predict how such symptoms will affect success in the driving task.

The instructor needs to work closely with a physician or therapist in trying to understand the nature of the problem and its impact upon driving. In situations where perceptual dysfunctions seem to exist, a road test becomes a very important part of the pre-driving assessment process. Coupled with the medical evaluation, the road test should enable the instructor to obtain a fairly realistic appraisal of the student's perceptual problems as they affect the driving task. (See Section 3 of this guide for further discussion.)

F. Behavioral Symptoms

Behavioral disorders are the hardest to quantify or describe. They may include a tendency to become easily upset, angered, or agitated under stress; poor judgment; distractibility; short attention span; inability to concentrate on more than one thing at a time while under stress; or others. It is imperative that the instructor work with a specialist knowledgeable in behavioral problems in order to understand and more effectively teach students with behavioral problems.

2. Some Common Disabilities Involving Brain Damage

A. Left Hemiplegia

This disability usually occurs as the result of a cerebral vascular impairment, or stroke, on the right side of the brain. Symptoms usually include neuromotor problems on the left side of the body, ranging from mild incoordination to loss of sensation and paralysis. Severe neuromotor disability may require that the student learn to drive using only the right arm and leg.

See Cards 1, 8, 12, and 21.

Perceptual or visual problems may include depth perception and spatial relationships, and blind spots in the left field of vision. Perceptual difficulties will require thorough assessment in terms of their effects on driving. Specific blind spots can, in some cases, be compensated for by appropriately placed mirrors. Thorough training in scanning and compensation techniques might also be helpful.

Intellectual problems may include difficulty in reasoning, abstracting, and interpreting symbols. For example, the student might clearly perceive a car approaching from the right at a high rate of speed, but not interpret this as a potentially dangerous situation requiring preventive action on his or her part. It is often difficult to identify such intellectual deficits and even more difficult to assess their impact on learning to drive. Assessment testing may best be done through simulation.

See Cards 2, 9, 12, and 21.

B. Right Hemiplegia

Right hemiplegia is usually the result of a stroke on the left side of the brain, causing impairment of the right side of the body. Neuromotor problems involve the right arm and leg. The occurrence of perceptual, visual, and intellectual problems is less severe. Therefore, individuals suffering from this kind of disability have a greater potential for becoming competent drivers.

The individual with right hemiplegia may have a condition called aphasia, which involves difficulties with talking, reading, and verbal comprehension. An aphasic may know what to say and not be able to say it or may have the ability to respond but not be able to understand the question. Both situations are extremely frustrating and often lead to anger or self-abuse. Assistance from a therapist should be sought to learn techniques for effective communication. Keeping verbal directions very simple and explicit will be helpful, and demonstration is even better. The aphasic student will need special preparation for the driver examination, and an appointment with special examiners may be necessary if verbal instructions are confusing. The instructor should understand that aphasis does not indicate lack of intelligence or alertness.

Although hemiplegia is sometimes found in children, many hemiplegics are mature adults who have had a stroke in the forties or later. For these individuals, many of whom drove before their stroke, driver education is often a matter of relearning how to drive and of learning how to readjust to their limitations. Many hemiplegics will not recognize that their abilities as drivers have been impaired and that retraining is really needed. Time is a distinct asset in this adjustment process. Often, the longer the time between the onset of the condition and the entrance into a driver education program, the better the prospects for success.

C. Head Trauma

Head trauma results from some kind of blow to the head, causing an injury to the brain. Unfortunately, no predictable pattern of symptoms is associated with head trauma. The effects of the trauma can be similar to those of left or right hemiplegia, in which case the instructor should consider the same approach as for a stroke victim. Sometimes the person will have a neuromotor problem on both sides of the body. Just as often no physical symptoms will occur.

See Cards 1, 2, 3, 8, 9, 10, 12, and 21.

The instructor should be prepared for perceptual and intellectual symptoms, especially those relating to judgment or decision making. A thorough assessment with the consultation of medical personnel will be in order.

D. Cerebral Palsy

Cerebral palsy is permanent and chronic, having been sustained at birth. A wide variety of symptoms is associated with cerebral palsy, often involving all six major symptoms to some degree.

Neuromotor symptoms may be especially severe, causing seizures, lack of muscle control in one or more parts of the body, and general muscle weakness. Lapses of consciousness may also occur.

See Cards 12, 20, 21, and 23.

Perceptual problems include blind areas in the field of vision and other distortions. Neurosensory problems can include both visual and hearing dysfunctions. (See Section 5 of this guide regarding visual and hearing impairment.) Speech may be quite labored and distorted.

Intellectual problems can include poor reasoning ability, distractibility, short attention span, poor judgment, difficulty with learning, and difficulty interpreting symbols or verbal directions. Intellectual and neuromotor problems

often contribute to behavioral symptoms, including anxiety and emotional instability, especially under stress.

The instructor should also be aware of medication the student is taking to control symptoms, which might cause drowsiness, light-headedness, or slow reaction time.

The pre-driving assessment process should be especially thorough, and the instructor must be careful not to prejudge the person with cerebral palsy on the basis of appearances. For many cerebral palsy sufferers, who have been dealing with their conditions since birth, high motivation and large investments of time have been key factors in enabling them to learn to drive successfully. However, it must also be noted that expectations of cerebral palsy students may be unrealistically high and that persons with severe conditions may be among the most difficult to teach to drive. Patience on the part of the instructor is a must with the cerebral palsy student. Success may take a long time to achieve.

Driver Education Requirements for the Handicapped Student

Generally speaking, the goals of driver education for the physically handicapped student are the same as those for the nonhandicapped student. However, in addition to those tasks normally necessary to operate an automobile, there are four additional tasks which the handicapped driver must master:

1. Entering the Car

   The handicapped driver should be able to enter the automobile unassisted. Ideally, this should include being able to transfer such devices as crutches, wheelchair, transfer board, or oxygen tank into the car. For some students, independent entry might necessitate the installation of an assist strap or bar in the training car. For some, a van with a power lift is the only answer.

   While Ohio law does not require independent entry and exit for licensure as a driver, most students can accomplish it with appropriate assist devices and training. This independence will benefit the student in terms of mobility, self-concept, and safety, and is worth the time and effort required to master it.

   Training in car entry in some cases should begin before behind-the-wheel instruction begins, thus giving the student time to build the capacity throughout the course. So as not to delay lesson schedules, sufficient time should be planned in each lesson for independent entry and exit of the handicapped student. The time required will vary with the individual.

See Cards 3, 4, 13, 18, and 20.

2. Leaving the Car

   The handicapped driver should be able to get out of the automobile unassisted. Again, this should include removing assist devices if possible.

See Cards 3, 4, 13, 18, and 20.

See Cards 1 through 22.

3. Using Adaptive Controls

The handicapped driver must be able to operate effectively any adaptive controls. Use of the controls should be learned before driving maneuvers are undertaken.

4. Maintaining Balance

The handicapped driver must be able to maintain a stable and balanced body position behind the wheel with the car in motion. Balance may be improved by the use of safety restraints, contour back rests, cushions, arm rests, and any prescribed prosthetic devices.

See Card 19.

1. Schedule the student into the regular driver education class.

   Unless the disabled student requires special treatment that cannot be provided in the regular school program, it is recommended that the physically handicapped student be scheduled into the regular driver education class. It is important that the school world resemble the world outside of school as closely as possible, including the environment which the disabled person cannot always control.

2. Work with the special education teacher and other staff.

   The instructor needs to work closely with the special education teacher, guidance counselor, school psychologist, speech therapist, nurse, and any other specialists available to learn as much as possible about the student's medical, psychological, and family background, and achievements in other areas. In the regular classroom, the instructor must set the example for the other students of acceptance, understanding, and patience.

3. Use simulators.

   Use of simulators can be very advantageous when teaching the handicapped how to drive. Simulators are quite versatile. They can be valuable in developing the perceptual, judgmental, behavioral, and manipulative skills necessary to the driving task; in determining the readiness of the student to pursue driver education; in teaching driving maneuvers; and in evaluating the student's performance and readiness to use the training car. They can also be equipped with adaptive controls to permit practice in using these controls.

4. Be flexible and patient.

   Adapt yourself to the student's individual needs. Generally speaking, the handicapped individual will require more time to learn to drive than the non-handicapped individual. Be patient — don't help the student enter or exit the automobile except when absolutely necessary. It is important that the student

perceive this task as critical to achieving a meaningful degree of independence.

5. Learn to use adaptive controls.

   Learn to use all adaptive controls before demonstrating them. (Adaptive controls are discussed in the section that follows.) Practice driving with the controls and become proficient in their use before trying to teach a student to use them. As you learn to use each control, develop a task analysis which you can apply when teaching its use to students. Learn to fold a wheelchair.

6. Be selective in use of adaptive controls.

   Use as few adaptive controls as possible. Assume that the least amount of adaptation is necessary. Then, if additional controls are needed, add them. If it is not possible to have an instructional car solely for use by handicapped students, adaptive devices should be installed so as not to inhibit the use of the car by nonhandicapped drivers.

7. Be sensitive to individual needs.

   Be very sensitive to a tendency to fatigue in students with extensive muscular impairment or pulmonary or cardiac diseases. This can be a factor both in their ability to learn at any given time and in their ability to perform what they have learned. For students who fatigue easily, begin with short training periods and gradually increase their length. If the student is participating in a physical therapy program, encourage the student to continue in that program.

See Cards 13 and 22.

With paraplegics and quadriplegics, be sensitive to the possibility of decubitus ulcers (pressure sores from sitting for extended periods). The student should learn to relieve the pressure periodically by lying down on the seat or lifting him- or herself off the seat with the arms.

See Cards 13 and 22.

8. Enlist the assistance of parents.

   Parents can be especially helpful in assisting the student to obtain a learner's permit and in providing time for driving practice. Adaptation of the family car should also be coordinated with the types of adaptation the student learns to use in driver education. This should be done as early in the program as possible to give the student ample time for practice.

Cars for the Physically Handicapped

The choice of an automobile to be adapted for use by disabled drivers is important in facilitating laboratory education. Depending on the disabilities included in the program, the car should include all or some features a through j listed on the following pages. The student's personal car might include (in addition to those listed for the laboratory car) items k through p. These items are less crucial for the laboratory car because the student is always accompanied by the instructor and seldom is in the car for extensive periods.

Some students with extensive disabilities (for example, quadriplegia) might require an adapted van with power lift, which can be driven from the wheelchair. If your program has the need for such a vehicle and the means for obtaining one, experts should be consulted (Rehabilitative Services Commission, manufacturers of adaptive devices, or others).

Feature	Comments
a. Two-door design (intermediate or larger) (See Cards 1, 2, 3, and 13.)	A two-door car provides more room for the handicapped person to transfer into and out of the car. This is most important for those with paralysis and amputation.
b. Bench-type seats (See Cards 1, 2, 3, and 13.)	A person in a wheelchair usually enters the car in one of two ways: (a) the driver enters from the passenger side, brings the chair in after, then secures it on the passenger side with the seat belt or shoulder harness so it will not roll when the car makes a sharp turn, or (b) the driver enters on the driver side and pulls the chair into the back seat directly behind the driver's seat. To allow the student to enter whichever way seems easier, bench type seats should be chosen. Bucket seats make it difficult for a driver to slide across and under the steering wheel.
c. Automatic transmission	A manual transmission would present an unnecessary challenge for most physically handicapped persons. A student who does want to learn to drive a car with a manual transmission should first master the driving task with an automatic transmission, then try the manual.
d. Power steering (See Cards 3, 5, 6, 7, 8, 9, 13, 20, 21, and 22.)	Power steering is a must for any driver using only one hand to steer and for those with poor endurance, general muscle weakness, and poor muscle control.
e. Power brakes (See Cards 3, 5, 6, 7, 8, 9, 13, 20, 21, and 22.)	Power brakes are very helpful for drivers using hand operated brakes and for those with poor endurance, general muscle weakness, poor muscle control, and slow reaction time.
f. Tilt steering wheel	Some disabled drivers have to be propped up to see over the steering wheel properly. This can cause their legs to come in contact with the steering column unless it can be tilted. Also, a wheel that can be tilted will allow more maneuvering room for the driver entering the vehicle. A telescopic steering wheel gives added convenience.
g. Power (six-way) seat	Manually adjusted seats can be difficult for a disabled driver to manage. Power seats make it easy for the driver to put the seat in its rearmost position for entry and exit and in a forward and raised position for ease and comfort while driving.

Feature	Comments
h. Armrests (See Cards 3 and 13.)	An armrest on the driver's door is very important for balance. A fold-down or portable armrest to the right of the driver is also very helpful. Armrests are most important for quadriplegics, paraplegics, and others who have lost control of trunk muscles.
i. Contoured seat cushion (See Cards 3, 13, and 18.)	Many disabled drivers need a bottom cushion to have proper view of the field of traffic. If a bottom cushion is used, normally a back cushion is also required. A contoured cushion for the back may help the driver maintain balance. A cushion with protrusions next to the driver's shoulders is helpful in come cases. Cushions are most important for people with small body size, quadriplegics, paraplegics, and others who have lost control of trunk muscles.
j. Mirrors adjustable from the inside	Adjustable mirrors are very helpful on any automobile that is regularly driven by several drivers (a laboratory car or a family car).

Feature	Comments
k. Power windows (See Cards 5 through 11 and 13.)	Power windows are a helpful feature, especially for operating the window at toll booths and parking garages. Drivers who are weak or who have both arms paralyzed or amputated without prosthesis may find power windows especially useful. Where power windows are not used, adaptations of the window cranks may be required. For example, rings attached to the cranks might make them easier for a person with prosthetic hooks to use.
l. Electric door locks	These are important for drivers with restricted mobility, who may have difficulty locking the doors individually.
m. Air conditioning (See Cards 3, 13, and 22.)	Controlled air temperature may be required for those with spinal cord injuries who have lost the capacity for temperature control and for some people with pulmonary diseases.
n. Cruise control (See Cards 20, 21, and 22.)	Cruise control can make driving less fatiguing on long trips. This is especially important for drivers with poor endurance, poor muscle control, and general muscle weakness.
o. Rear window defroster	Scraping ice and frost off car windows can be a real problem for a person with limited mobility, poor endurance, or general weakness. A rear window defroster can help with this problem.
p. Citizen's band radio (See Cards 13, 20, and 22.)	When assistance is needed, a CB radio can be invaluable. Care should be taken in selecting and installing a CB that it can be operated easily by the individual.

Adaptive Controls for the Car

Many types of adaptive controls are available for installation in laboratory cars and personal cars. Some are available to fit specific makes and years of vehicle, some fit virtually any car, and some can be ordered custom-made. The following chart lists the most common types of controls available and their purposes. For additional information on specific uses of each device, see the booklet "Physical Handicap Summaries," which accompanies this guide. Manufacturers of the various devices, most of whom lend controls to driver education programs without charge, are listed in Appendix C.

Device	Purpose
a. Hand controls (include push-pull, push-twist, and push-right angle) (See Cards 3, 4, 13, 17, and 18.)	Hand controls allow the person with impaired leg function to drive a regular car by activating the brake and accelerator with a single hand lever. Controls are available for left or right hand.
b. Steering devices (knob, "V," tri-post, and wrist cuff) (See Cards 8, 9, 12, 13, 14, 15, 18, and 21.)	Steering devices enable a person with impairment of one or both arms or hands to steer with one hand. They also enable a driver using hand operated brake and accelerator to steer with the other hand. They can be mounted in various positions on the steering wheel, for left or right hand.
c. Left foot accelerator (See Card 2.)	Installed to the left of the brake, this device enables the driver with an impaired right foot or leg to operate the accelerator and brake with the left foot.
d. Left hand gear shift lever (See Card 9.)	This control enables the driver with an impaired right hand or arm to shift with the left hand.
e. Right hand turn signal (See Cards 8 and 9.)	This control enables the driver with an impaired left hand or arm to operate the turn signal with the right hand. It also enables the driver using left hand steering and right hand brake/accelerator to signal a turn while maintaining steering control (electrical signal is preferred, however).
f. Hand operated dimmer switch with horn (See Cards 1, 2, 3, 4, 13, 17, and 18.)	The dimmer switch and horn device enables the individual with an impaired left leg, or a person with an impaired right leg who is using a left foot accelerator and brake, to dim lights by hand. A horn button is added so that the horn may be sounded without taking the hands off the other controls.
g. Hand operated parking brake (See Cards 1, 3, 4, 8, 13, 17, and 20.)	This device enables the driver with an impaired left leg and normal arm length and strength to use the parking brake.
h. Parking brake mounted for right foot (See Card 1.)	The right foot parking brake enables the driver with an impaired left leg and arm but normal use of the right leg to use the parking brake with the right foot.

Device	Purpose
i. Foot operated steering (See Cards 10 and 15.)	Foot operated steering enables the driver with severe impairment of both arms to steer with one foot while braking and accelerating with the other.
j. Extension blocks for brake and accelerator (See Cards 4 and 18.)	Extension blocks enable the driver with short legs to reach the brake and accelerator. Extensions over two inches are not recommended.
k. Dash control adaptations (rings, extenders, or plates) (See cards 5 through 15 and 18.)	These adaptations enable the person with prosthetic hands, impaired use of the arms, or short arms to operate dash controls.
l. Special mirrors (48°, convex, or multi-view rear view mirror and side view mirror) (See Cards 13, 15, 16, and 17.)	Special mirrors enable drivers with perceptual problems or lack of range of motion in neck or shoulders to have a better view of the field of traffic. Special mirrors are often used by deaf drivers.
m. Safety restraints (waist, chest, lap, shoulder, and combinations) (See Cards 1, 2, 3, 13, and 19.)	Safety restraints enable drivers with balance problems (quadriplegics, paraplegics, and others who have lost control of trunk muscles) to maintain balance while the car is in motion.
n. Entry/exit assists (transfer board, assist bar/overhead grab bar, assist strap, wheelchair ramp) (See Cards 11, 12, 13, 15, and 18.)	These assists facilitate independent entry and exit of the disabled driver to and from the car. They are especially important for the quadriplegic and paraplegic.
o. Key holders (key bar, key ring) (See Cards 11, 12, 13, 15, and 18.)	Key holders enable quadriplegic, arthritic, or those with poor muscle control and grasp in the right hand to hold ignition and door keys.

Types of Hand-Operated Brake and Accelerator

The three main types of adaptive hand controls available are described below.

Device	Description
a. Push-pull	The principle here is push to brake, pull to accelerate. This control requires a functional grip. A disadvantage found in some models of push-pull devices is that it is not possible to accelerate and brake simultaneously, as might be required when stopped on a hill. This control is more likely to be fatiguing for the disabled driver to use than the other types.
b. Push-twist	The principle of this device is push to brake, twist to accelerate. This control will allow braking and accelerating simultaneously. However, use of this control requires that the individual be able to rotate the wrist. It also tends to be fatiguing.
c. Push-right	This is the most sophisticated hand control. It can be mounted on the dashboard to provide more leg room. Any handicapped person needing hand controls who has functional use of the arm can use it. However, some sources say that it is the hardest of the three to learn to use.

Selecting and Installing Adaptive Devices

At the present time there are no government regulations on the design, manufacture, or sale of adaptive controls. The Veterans Administration has tested and approved some equipment. The major implication of this is that the purchaser must be very careful when obtaining adaptive controls: only proven controls should be chosen, as there is no economy in using cheap equipment or makeshift controls.[23] Well-engineered equipment can be transferred from car to car fairly easily.

It is also important to make sure that adaptive controls are installed in such a way that the able-bodied driver can operate the car without interference from the controls. Aaron and Kraemer give some general guidelines for installing adaptive controls.

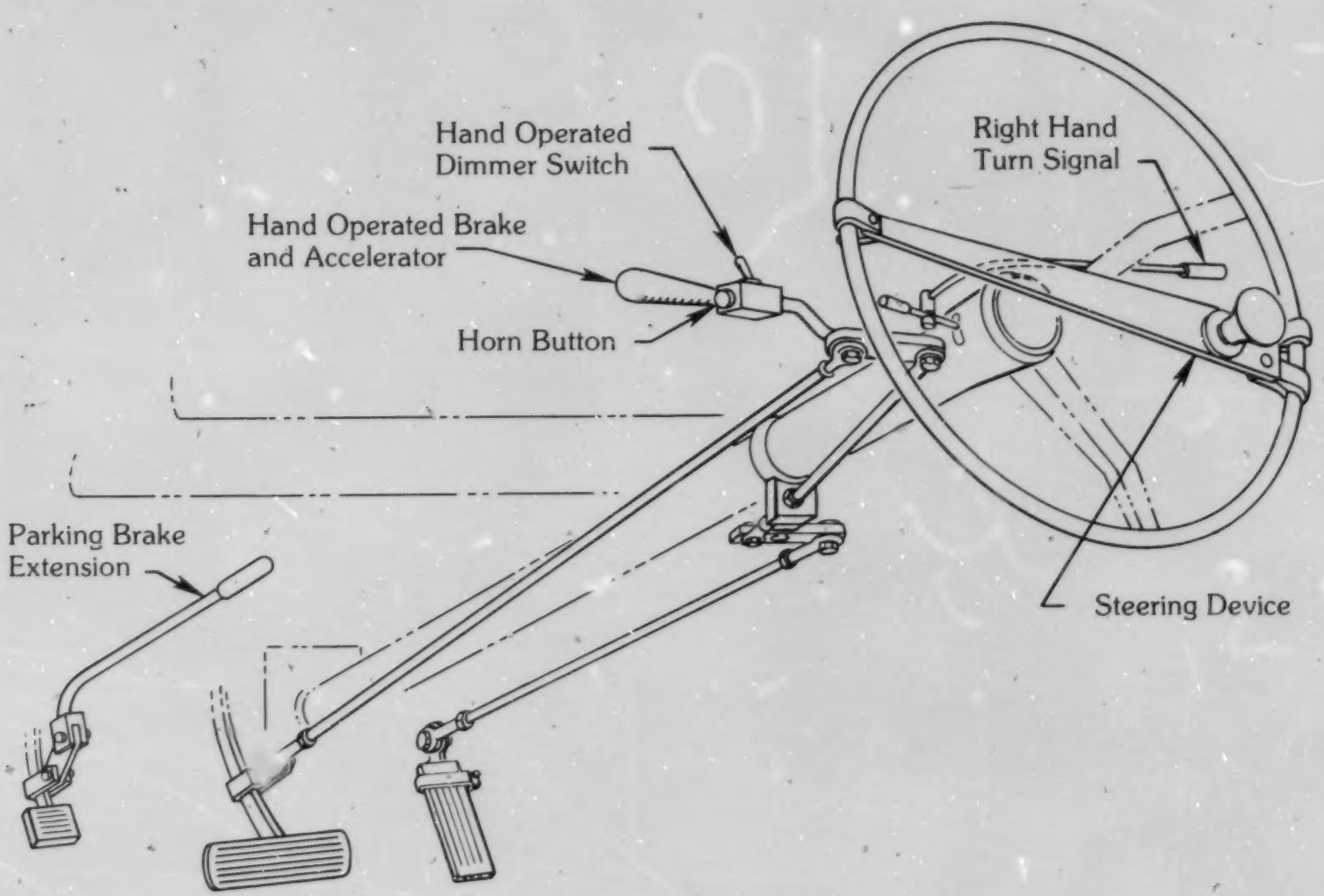
1. The supplier should provide a 30-day money-back guarantee.
2. If controls are to be mounted on a collapsible steering column, they should not be attached to the steering column itself.
3. The controls should be firmly attached to the vehicle and tested before being put into service.
4. All connections should be made secure with locknuts, lock washers, or cotter pins.
5. The hand lever should be in a convenient location and should not interfere with the steering wheel when in the released position.
6. Before a control is ordered, a careful analysis should be made of the needs of the individual involved. Selection should be based on an assessment of the student's range of motion, balance, and strength.[24]

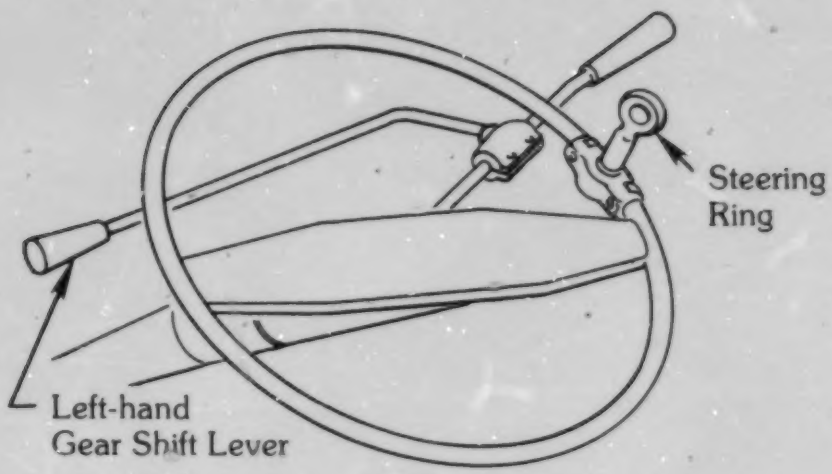
Obviously, before the instructor can effectively teach the physically handicapped student to drive, knowledge of the various types of driving aids is necessary. The instructor should be thoroughly acquainted with the operation of all controls that have been installed and should practice with them to the point of proficiency before beginning to teach the student to use them.

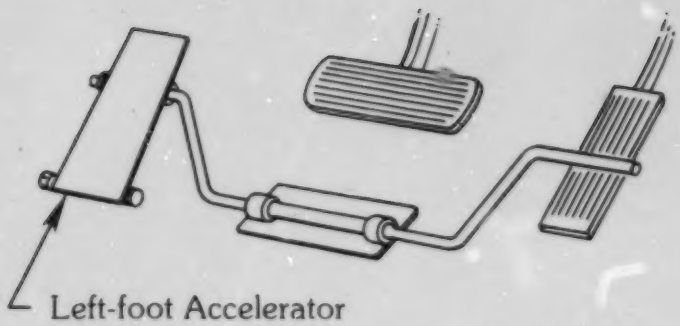
[23]Some programs that have the capacity for producing temporary adaptations might find experimentation with temporary controls useful in determining the exact combination and dimensions of controls needed.

[24]*Driver Education for the Handicapped: A Resource Curriculum in Driver Education Teacher Preparation*, James E. Aaron and David G. Kraemer, pp. 156-157.

Selective Adaptive Controls



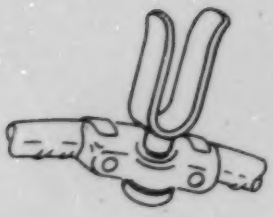

Steering
Ring
Left-hand
Gear Shift Lever


Left-foot Accelerator

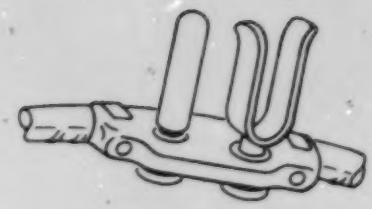
Other Steering Devices

Spinning Knob

Quad Spinner

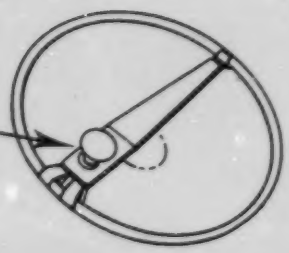


Quad Grip with Pin



Flat Quad Spinner

Knob on
Cross Piece



7 OHIO DRIVER'S LICENSE EXAMINATION PROCEDURES

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Introduction

This section briefly describes the procedures necessary for handicapped students to obtain a driver's license. Two state agencies are involved in this procedure. The State Highway Patrol administers the various tests through its examiner's stations. If there are no extenuating circumstances, the driver's license is routinely issued by the Bureau of Motor Vehicles (BMV). If there are extenuating circumstances (for example, when an applicant has under medical control a condition which could result in seizures or sudden loss of consciousness), the BMV Driver's License Case Section makes the final determination in issuing the driver's license. These decisions are made on a case-by-case basis.

For handicapped applicants, the driver's license procedure consists of the same two basic steps as for nonhandicapped applicants: the learner's permit and the driver's license. It is important to note that the handicapped student must pass the same tests with the same proficiency as any other applicant in order to obtain these permits.[25] The examining and licensing authorities do, however, have provisions to guard against artificial barriers interfering with the success of otherwise qualified handicapped applicants. A summary of procedures for the two permits, especially as they pertain to handicapped students, is given in this section.

[25]The best sources of information regarding examinations for licensing are the *Ohio Driver's Handbook*, available from The Ohio Department of Highway Safety or the Ohio Department of Education, and the local examiner's station. (Procedures outlined here and in the *Handbook* are subject to change periodically; the personnel at the examiner's stations will have the most up-to-date information.)

Learner's Permit

In order to obtain the learner's permit, the applicant must take a pre-examination which includes two tests: the vision test and the cognitive test. The following sequence of procedures is followed in cases where conditions require it.

1. The applicant:

    a. purchases a licensing packet from the Deputy Registrar (applicants need birth certificate or other legal document for proof of age and should have a social security account number; those under 18 must be accompanied by a co-signer),

    b. takes vision test,

    c. answers questions regarding driving and medical status,

    d. takes written test,

    e. receives medical forms,

    f. forwards medical forms to physician who should complete them and mail them to applicant,

    g. returns medical forms to the examiner's station (the examiner's station will hold the purchased licensing packet until receipt of the completed medical forms).

2. The examiner's station mails documents to BMV.

3. BMV Driver's License Case Section determines on a case-by-case basis whether a learner's permit will be issued.

Vision Test

The applicant must have at least 20/70 vision in one eye with or without correction.

Written Test

All applicants are required to take a written test on traffic laws and signs. If the applicant fails this test or is unable to complete it and the examiners judge that this failure is due to a language deficit or other factor not related to the content of the test (for example, if an applicant cannot read or does not understand English), the examiners can administer an oral test.

These oral tests are tape recorded and available in a variety of languages in addition to English. In cases where none of the tapes is suitable for the particular problem, a test can be administered orally by an individual rather than by tape recording.

The following information may be useful with regard to handicapped students.

1. No appointment is usually required for the learner's permit, although an individually administered oral test might require an appointment. Testing is done on a walk-in basis and decisions as to alternative testing forms are made after the applicant arrives.

2. Applicants are generally required to attempt the written test. Alternate testing procedures are not available simply on request; they are used only after the examiner has made a decision regarding their necessity. However, a driver education instructor may write a letter describing a student's reading difficulty, which might help the examiner make the decision.

3. There is no time limit for completing the cognitive test except that it must be finished by the end of the business day at the examiner's station.

4. The learner's permit test is written at approximately the sixth grade reading level. It is important that the students be prepared with the vocabulary skills to understand the test. Students with mild mental handicaps or hearing impairments and others with reading problems might well have to be taught traffic safety vocabulary.

5. On the oral tapes, each test item is read twice. Make sure your students know this!

6. A deaf applicant who needs an interpreter must bring his or her own interpreter to the examiner's station.

Driver's License

After the applicant has obtained a learner's permit and gained enough skill and knowledge to become a driver, a driving test must be passed in order to obtain a driver's license. The driving test is essentially the same for handicapped applicants as for nonhandicapped.

The following information pertains to the handicapped applicant.

1. An appointment is required for the driving test. It might be helpful to mention use of adaptive controls or any other factors that might affect scheduling at the time the appointment is made.
2. The applicant does not have to be able to transfer into and out of the car independently.
3. Adaptive controls should, of course, be safe and reliable. However, there presently are no specific standards for their construction. If they function properly and the driver is able to use them to operate the car safely and pass the test, their construction does not bear upon eligibility for a license.
4. There are no restrictions on the vehicle itself other than that it be in a safe condition and able to pass a state motor vehicle equipment inspection, should such an inspection be made.
5. The car may belong to the applicant, a driver education program, or anyone else.
6. No one other than the applicant and examining officer may be in the car during the test. This means that the deaf cannot have an interpreter in the car with them. It is recommended that an interpreter, the deaf applicant, and the examiner spend a short time prior to the driving test agreeing upon the examiner's means of communicating instructions to the applicant.
7. The examiner in charge of the station should be able to resolve any difficulties that might arise.

License Restrictions

On the reverse of the driver's license are a number of "common restrictions" which may be applied to the license. These include such restrictions as requiring corrective lenses, special hand controls, spinner knob, or power steering. If one or more of these restrictions are applied, the applicant will be licensed to drive only under those restrictions. These "common restrictions" are determined by the local examiner's station.

Additionally, the BMV Driver's License Case Section may issue a restrictive license in cases where the medical control of a condition producing sudden unconsciousness or seizures, or other condition affecting the driver's safe operation of the vehicle, is under scrutiny. To receive such a license, the condition must be dormant or under medical control. A restrictive license must be revalidated periodically.

Special License Plates

Some applicants may be eligible to obtain special automotive license plates which provide for special parking locations and privileges. This is discussed in detail in Section 2.

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Appendix B Audiovisual Materials for the Instructor

Most of the following audiovisual materials listed here are for the instructor. Those preceded by an asterisk are intended for use with students. In addition, some of those not bearing an asterisk might be appropriate for use with students after having been viewed by the instructor.

This list is not intended to be comprehensive; undoubtedly there are many other audiovisual materials available that would be equally useful. (The Ohio Special Education Regional Resource Centers and other sources listed on page 53 are good sources for other audiovisual materials.) However, the list should be helpful to the instructor trying to locate materials related to the three segments of the handicapped population discussed in this guide. Inclusion of materials in this list does not constitute recommendation or endorsement. Contact sources listed for availability and cost.

Materials Related to Mild Mental Handicaps

1. "Early Recognition of Learning Disabilities"

   Color, 30 min., 16mm film optical sound. 1969.

   Shows the perceptual, conceptual, and coordinative problems of children who are victims of the hard-to-define affliction called minimal brain dysfunction.

   National Medical Audiovisual Center, 2111 Plaster Ridge Rd., Atlanta, GA 30324

2. "If A Boy Can't Learn"

   Color, 16mm film, 40 min. 1972

   A 17-year-old learning disabled high school student is given a series of tests to determine why he cannot learn. These tests are not restricted to written tests but also include physical and oral tests. The test results indicate what techniques should be used to help Mike learn.

   The film follows Mike's progress under the new techniques. The film emphasizes that if children do not learn in the traditional way, this does not mean they are not capable of learning.

   Lawren Productions, Inc., P.O. Box 1542, Burlingame, CA 94010

3. "Intellectual Disabilities: A Series"

   Filmstrip with record, cassette, script. 1975.

Explains mental retardation and how to spot symptomatic behavior in the young child. Discusses treatment and the various programs available. Includes:

Educational Help	53 frames
Five Types of Services	54 frames
Mental Retardation Is	61 frames
Parental Involvement	56 frames
Recognizing the Symptoms	52 frames

Parent's Magazine Films, Inc., 52 Vanderbilt Ave., New York, NY 10017

4. "Invisible Handicaps"

Color, 16mm sound, 60 min.

CBS News Production. Carousel Film, Inc. 1501 Broadway, New York, NY 10036

5. "Mental Retardation, Part 2"

Color, 29 min., 16mm film optical sound. 1967.

Deals with the needs and most recent breakthroughs in the training, education, and habilitation of the moderately, mild, and borderline groups of mentally retarded. Special education facilities, sheltered workshop, and work adjustment services are featured.

University of Wisconsin, Bureau of Audiovisual Instruction, 440 Henry Mall, P.O. 2093, Madison, WI 53701

*6. Personal Reading Modules

Modules appropriate for students with low reading skills include illustrated books; read-along cassettes; skill development booklets emphasizing vocabulary, comprehension, and decoding; glossaries; "challenge" activities; and teacher's manual. Modules relevant to driver education include:

"How to Read a Map" (reading level 3.7)
"Financing a Car" (reading level 4.6)
"Buying a Used Car" (reading level 4.1)
"What You Should Know About Insurance" (reading level 4.2)

Relevant Productions, Inc., 319-321 Gulf Boulevard, Indian Rocks Beach, Florida 33535

7. "Specific Learning Disabilities"

Series includes:

Diagnosis
Evaluation
Remedial Program
(Technical details not available)

Davidson Films, Inc., 3701 Buchanan St., San Francisco, CA 94123.

8. "Verbal Impairment Associated with Brain Damage"

   Color, 16mm film optical sound. 1966.

   Speech therapists demonstrate in a series of testing sequences how three syndromes of verbal impairment can be differentiated from each other by a careful analysis based on a linguistic description. Shows a systematic replicable method for identifying and sorting symptoms.

   New York University Film Library, 26 Washington Place, New York, NY 10003

Materials Related to Sensory Handicaps

1. "Silent World, Muffled World"

   Black and white, 28 min., 16mm film optical sound or ¾ in. video cassette. 1966.

   Relates the difficulties of speech, education, and normal living for the deafened, and shows new methods of education and rehabilitation. Uses animation to explain mechanics of hearing and types of impairment. Narrated by Gregory Peck.

   U.S. National Audiovisual Center, General Services Administration; Washington, DC 20409

*2. "Rules of the Road for the Deaf"

   Series of 6 color videotapes, each 15 min. High school and adult.

   Sign language and visualization are used to help hearing impaired students learn basic rules and regulations that are asked on most written examinations. Series includes "Shapes of Signs," "Regulatory and Guide Signs," "Warning Signs," "Pavement Markings," "Right of Way," and "General Rules for Driving."

   Illinois Office of Education. Non-Illinois users should contact the Division of Communications, Northern Illinois University, DeKalb, Illinois to obtain permission and videotape copies of the program.

*3. "Driving Techniques for the Deaf"

   Series of 6 color videotapes, each 15 min. High school and adult.

   Sign language and visualization are used to help hearing impaired students develop observational skills while operating a motor vehicle. Series includes "I.P.D.E.," "Identifying People and Cars as You Drive," "Identification Continued," "Predict and Decide," "Prediction and Decision Continued," and "Summary."

   For source, see "Rules of the Road for the Deaf."

Materials Related to Physical Handicaps

1. "A Day In the Life of Bonnie Consolo"

   Color, 16mm sound.

   Illustrates how a physically handicapped wife and mother goes about leading a full and active life.

   Barr Films, 3492 E. Foothill Blvd., P.O. Box 5667, Pasadena, California 91107

2. "A Guide to Wheelchair Transfer Techniques"

   Color, sound filmstrip and record.

   Illustrates how to execute sitting and standing transfers from wheelchair to bed, bed to wheelchair, wheelchair to chair, and wheelchair to car.

   Sister Kenny Institute, 1800 Chicago Ave., Minneapolis, MN 55404

3. "The Hemiparetic Patient: In and Out of Car (Patient Walking with Cane)"

   Color, 3 min., 16mm film optical sound; S8mm cartridge magnetic sound. 1970.

   Demonstrates the use of a cane in entering and leaving a car.

   U.S. National Audiovisual Center, General Services Administration, Washington, DC 20409

4. "The Hemiparetic Patient: Transfer from Wheelchair to Car and Reverse"

   Color, 4 min., S8mm cartridge magnetic sound or 8 min. 16mm film optical sound. 1970.

   Demonstrates the transfer of a hemiparetic patient between wheelchair and car.

   U.S. National Audiovisual Center, General Services Administration, Washington, DC 20409

5. "Paraplegic Patient Education: The Effects of Spinal Cord Injury"

   Color, 8 min., S8mm cartridge magnetic sound. 1969. 16mm film optical sound. 1970.

   Cites causes of spinal injuries, discusses the effect these injuries have on the individual and points out how to become as independent as possible.

   U.S. National Audiovisual Center, General Services Administration, Washington, DC 20409

6. "The Paraplegic Patient: In and Out of Car (Patient Using Crutches and Wearing Braces)"

Color, 5 min., S8mm cartridge magnetic sound. 1969. 16mm film optical sound. 1970.

Demonstrates the use of crutches and braces by paraplegics in moving in and out of a car.

U.S. National Audiovisual Center, General Services Administration, Washington, DC 20409

7. "Physical Disabilities: A Series"

Filmstrips, with record, cassette, script. 1975.

Explains the causes and symptoms of the various types of physical handicaps, the problems such disabilities can bring and how caregivers can help physically handicapped children adapt to and function in their world with the help of treatment and rehabilitation programs. Includes:

Diagnosis and Treatment	55 frames
Special Problems	59 frames
Support Services	56 frames
Three Different Kinds	61 frames
What Can We Do	56 frames

Parent's Magazine Films, Inc., 52 Vanderbilt Avenue, New York, NY 10017

8. "Quadriplegic Functional Skills: Driving"

Color, 19 min., 16mm film optical sound. 1974.

Demonstrates methods quadriplegics can use without assistance in transferring to and from a car and getting a wheelchair in and out of a car. Shows driving with hand controls and adaptations.

U.S. National Audiovisual Center, General Services Administration, Washington, DC 20409

9. "The Quadruparetic Patient: Transfer from Wheelchair to Car and Reverse Using Sliding"

Color, 8 min., S8mm cartridge magnetic sound. (no date).

Demonstrates the use of the sliding board for transfer of the quadruparetic patient between wheelchair and car.

New York University Film Library, 26 Washington Place, New York, NY 10003

10. "Special Equipment for the Handicapped Driver" and "Driving with a Disability"

(Technical details not available)

Motion Picture Laboratory, 781 S. Main St., Memphis, TN 38102

11. "Spinal Cord Injury"

    Color, 30 min., 16mm film optical sound. 1961.

    Shows the degrees of independence the average patient attains after injury at various neurological levels. Shows eight levels of spinal cord injury and demonstrates therapeutic technique and assistance devices.

    Rancho Los Amigos Hospital, Inc., 7601 East Imperial Highway, Downey, CA 90242

12. "Transfers, Part 2: Sitting Transfers"

    Color, 2 X 2 slides with script, 50 frames.

    Gives procedures for sitting transfer for patients who are unable to stand, such as those with paraplegia or bilateral lower extremity amputations. From "The Nursing Techniques for Long-Term Care" series.

    Sister Kenny Institute. 1800 Chicago Ave., Minneapolis, MN 55404

13. "Vehicle Selection for the Handicapped Driver"

    (Technical details not available)

    Galaxy Film Company, 3000 Francis Ave. S., Minneapolis, MN 55416

14. "Verbal Impairment Associated with Brain Damage"

    (See listing under "Materials Related to Mild Mental Handicaps.")

15. "Wheelchair Transfers for the Paraplegic"

    Color, 7 min., S8mm cartridge optical or magnetic sound, 16mm film optical sound. 1966.

    Explains and demonstrates three transfer techniques for the paraplegic patient: frontwards, sidewards with removable arm rests on the wheelchair, and sidewards without removable arm rests. Demonstrates the spotting techniques for the therapist.

    U.S. National Audiovisual Center, General Services Administration, Washington, DC 20409

Right Leg Missing or Nonfunctional 2

Causes

amputation (surgical or accidental)
paralysis
- stroke (right hemiplegia)
- nerve injury
- multiple sclerosis
- polio

head trauma
birth defect

Effects On The Driving Task

1. Inability to use standard accelerator.
2. Possible inability to maintain body balance (depending on height of amputation).
3. Awkwardness in using left foot dimmer switch (because left foot occupied with brake and accelerator).
4. Inability to use clutch.
5. Possibility of leg or foot interfering with driving mechanisms.

Implications For Driver Education

1. Left foot accelerator.
2. Shoulder- or chest-type safety restraints; arm rests.
3. Hand operated dimmer switch.
4. Automatic transmission.
5. Means of securing disabled leg (e.g., belt, loop, or barrier) to keep it from lodging against brake or accelerator.

Appendix C Manufacturers of Adaptive Controls (A partial listing**)

The following companies are manufacturers or distributors of adaptive controls and devices. Those marked with an asterisk* offer vans and lifts. For catalogs of available merchandise, contact individual companies. Specify the make, model, and year of the automobile you wish to adapt. For an up-to-date listing of manufacturers and "The Handicapped Driver's Mobility Guide" (including information on training facilities, resource organizations and services, and equipment) contact your local AAA office.

Arizona

* Auto Safety House, Inc.
4343 E. Washington St.
Phoenix, AZ 85004

California

Biatnik Precision Controls, Inc.
1523 Cota Ave.
Long Beach, CA 90813

Cameron Enns
13637 S. Madsen Ave.
Kingsbury, CA 93631

Cecil G. Zaun, Inc.
Decon
1380 Garfield Ave.
San Marino, CA 91108

* Compass Industries, Inc.
715 Fifteenth St.
Hermosa Beach, CA 90254

Humphrey, Inc.
9212 Balboa Ave.
San Diego, CA 92123

Kope, Inc.
1378 North Reed Ave.
Reedley, CA 93654

* Mac's Power Lift Gate
2727 South St.
Long Beach, CA 90805

Manufacturing and Production Services Corp.
4664 Mercury St.
San Diego, CA 92111

* Maxon Industries
1960 Slauson Ave.
Huntington Park, CA 90255

Mechtronics Industries
15315 South Broadway
Gardenia, CA 90247

Mobility Products and Design, Inc.
709 Kentucky St.
Vallejo, CA 94590

* Motorette Corp.
6014 Reseda Blvd.
Tarzana, CA 91356

* Robin-Aids, Inc.
3353 Broadway
Los Angeles, CA 94590

Trans-Aid Corp.
220 S. Glasgow Ave.
Inglewood, CA 90301

Trujillo Industries
5040 Firestone Blvd.
Southgate, CA 90280

Vabco Products
160 Gilbert St.
Fullerton, CA 92633

** *The Handicapped Driver's Mobility Guide*. American Automobile Association. 1978.

Venco
Santa Anita Mfg. Corp.
4961 Double Dr.
Temple City, CA 91780

• Wheelchair Boutique, Inc.
6730 Folsom Blvd.
Sacramento, CA 95819

White Engineering & Mfg. Co.
P.O. Box 195
Tustin, CA 92608

Colorado

Chisholm Mfg. Co.
317 13th St.
Greely, CO 80631

Handicaps, Inc.
4335 S. Santa Fe Dr.
Englewood, CO 80110

• Royce International, Ltd.
1871 S. Acoma
Denver, CO 80223

• Wheelchairs, Inc.
2401 S. Downing
Denver, CO 80201

Connecticut

• Dombroski, Wilfred
249 W. Park Ave.
New Haven, CT 06511

Delaware

Amsterdam Brothers, Inc.
608 N. Union St.
Wilmington, DE 19899

District of Columbia

Camalier and Buckley
1141 Connecticut Ave., N.W.
Washington, DC 20036

Florida

Dowd Rental Service and Sales, Inc.
310 N.E. 61st St.
Miami, FL 33137

Edwin Drew Co.
2071 Emerson St.
Jacksonville, FL 32207

• Helper Industries, Inc.
832 N.W. First St.
Fort Lauderdale, FL 33311

Nelson Medical Products, Inc.
5690-A Sarah Ave.
Sarasota, FL 33581

Winfield, Inc.
3062 46th Ave. North
St. Petersburg, FL 33714

Illinois

Car Hand Controls
266 East Park Ave.
Elmhurst, IL 60126

Downs & Company
1014 Davis St.
Evanston, IL 60204

• Fred Scott & Sons
101 Kelly St.
Elk Grove, IL 60007

• Handi-Ramp, Inc.
1414 Armour Blvd.
Mundelein, IL 60060

• R.J. Chair Lift Co., Inc.
7228 W. Madison St.
Forest Park, IL 60130

Rehabilitation Equipment and Supply
1823 W. Mass Ave.
Peoria, IL 61606

Wells-Enberg Co., Inc.
P.O. Box 6388
Rockford, IL 61125

Indiana

- Braun Corp.
  1014 S. Monticello St.
  Wilnamac, IN 46996

- Save-a-Step Mfg. Co.
  401 S. Franklin St.
  Wilnamac, IN 46996

Iowa

Iowa Sickroom Supply, Inc.
1744 Sixth Ave.
Des Moines, IA 50314

Kansas

- Collins Industries, Inc.
  P.O. Box 58
  Hutchinson, KS 67501

Maryland

Fairfield Medical, Inc.
10 Winters Lane
Baltimore, MD 21228

Massachusetts

H.P. Bus Corp. of America
P.O. Box 28, Department WT
North Billerica, MA 01862

Market Forge Company
Everett, MA 02149

Roberts Services
P.O. Box 68
Needham Heights, MA 02194

Sleeper Equipment Co., Inc.
Littleton Road
Routes 110 and 225
Westford, MA 01886

- Target Industries, Inc.
  1264 Union St.
  West Springfield, MA 01089

West Medical, Inc.
225 Worcester Road
Framingham, MA 01701

Michigan

- Automotive Conversion Corp.
  2566 Industrial Row
  Troy, MI 48084

- Gresham Driving Aids
  30800 Wixom Road
  P.O. Box 405
  Wixom, MI 48096

S.H. Camp
P.O. Box 89
Jackson, MI 49204

William Rogers
1124 Arthur
Mt. Pleasant, MI 48858

Minnesota

Cascade Sales Company
601 Kingwood
Brainerd, MN 56401

- Redi-Care Medical Equipment Co.
  2190 Marshall Ave.
  St. Paul, MN 55104

Rochester Orthopedic Appliances, Inc.
101 N. Broadway
Rochester, MN 55901

Mississippi

Smith Hand Control
1472 Brookhaven Dr.
Southhaven, MS 38671

Missouri

- Double D Industries
  110 Fox Hill Rd.
  St. Charles, MO 63301

Hughes Hand Driving Controls, Inc.
Tevis Bridge Rd.
Lexington, MO 64067

- Speedy Wagon Sales Corp.
  4105 Old Highway 94 South
  St. Charles, MO 63301

New Jersey

- Drive-Master Corp.
  16 Andrews Dr.
  West Paterson, NJ 07424

- General Mobility Corporation
  P.O. Box 1275R
  108 Ridgedale Ave.
  Morristown, NJ 07960

- National Institute for Rehabilitation Engineering
  238 Poplar Ave.
  Pompton Lakes, NJ 07442

New York

Dowd Rental Service and Sales, Inc.
1010 Main St.
Buffalo, NY 14202

Elmira Drug and Chemical Co., Inc.
1225 West Water St.
Elmira, NY 14905

Frey the Wheelman, Inc.
41 E. Tupper St.
Buffalo, NY 14203

J.A. Preston Corp.
71 Fifth Ave.
New York, NY 10003

Kroepke Kontrols, Inc.
104 Hawkins St.
Bronx, NY 10464

Medicab Conversions Ltd.
68-72 Runton Ave.
Yonkers, NY 10710

- Northwest Medical Sales and Service
  1032 Danforth St.
  Syracuse, NY 13208

OK Brakes, Inc.
416 Third Ave.
Brooklyn, NY 11215

- Victor Medical
  1570 Main St.
  Buffalo, NY 14209

North Dakota

Leverage Hand Brake Co.
P.O. Box 853
Fargo, ND 58102

Ohio

Cleveland Orthopedic Co.
3957 Mayfield Rd.
Cleveland, OH 44121

Oregon

- Safety Van Lift
  1627 Linnea St.
  Eugene, OR 97401

Pennsylvania

Abbey Rents
119 City Line Ave.
Bala Cynwyd, PA 19004

Accurate Medical Service
8004 West Chester Pike
Upper Darby, PA 19082

Ardmore Brake Service
1125 Ardmore Blvd.
East Pittsburgh, PA 15112

Derham Custom Body Company
James and Enos Derham
Rosemont, PA 44022

Dowd Medical Eqpt. Distributors
904 Pennsylvania Ave.
Wilkinsburg, PA 15221

Harmarville Rehabilitation Center
P.O. Box 11460
Guys Run Rd.
Pittsburgh, PA 15238

H. Neil Pangrazzi
18 E. Brandon St.
Sheppton, PA 18248

South Carolina

- Aaro Rents, Inc.
1010 Laurens Rd.
Greenville, SC 29607

Tennessee

Knoxville Orthopedic Appliance Co., Inc.
1833 Forest Ave.
Knoxville, TN 37916

Texas

Amco Medical Service
11329 North Central Expressway
Dallas, TX 75231

Car Hand Controls
P.O. Box 907
Garland, Texas 75040

- Kope Industries
138 W. Austin
Pasadena, TX 77502

Lux Artificial Limb and Brace Co.
503 San Pedro Ave.
San Antonio, TX 78212

Virginia

- Atlantic Research Corp.
5390 Cherokee Ave.
Alexandria, VA 22314

Die-a-Matic, Inc.
4004 Fifth Road North
Arlington, VA 22203

Ferguson Auto Service
1112 North Sheppard
Richmond, VA 23230

Tidewater Prosthetics Center, Inc.
259 York St.
Norfolk, VA 23510

Wisconsin

- Handicabs of Milwaukee
5620 W. Center St.
Milwaukee, WI 53210

Ted Hoyer & Company
2222 Minnesota St., Box 949
Oshkosh, WI 54901

Safety Magic Sales Co.
Janesville, WI 53545

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Additional copies may be obtained from:

Ohio Department of Education
Division of School Finance
Driver Education Section
65 South Front St., Rm. 811
Columbus, Ohio 43215

"An Equal Opportunity Employer"

Physical Handicap Summaries

Causes, Effects, and
Implications for Driver Education

This booklet, which is a part of the state curriculum guide *Driver Education for the Handicapped*, was prepared by the Ohio Department of Education in cooperation with the "Office of the Governor's Highway Safety Representative." Funds were provided by the National Highway Traffic Safety Administration of the United States Department of Transportation under 23 U.S.C., Section 402. The opinions, findings, and conclusions expressed in this publication are those of the authors and do not necessarily reflect the official views or policies of the National Highway Traffic Safety Administration.

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About This Booklet

Purpose

This booklet, which accompanies the curriculum guide *Driver Education for the Handicapped*, relates to Section 6 of that guide, "Physical Handicaps." It is intended to be used in conjunction with the text of that section and to serve as a convenient reference by itself. Using this booklet, the driver education instructor can quickly find concise information about specific handicaps and their impact on driver education.

Organization

Handicaps are presented in terms of specific symptoms (for example, lack of range of motion: shoulders) that the instructor might encounter. For each symptom, a number of possible causes (but certainly not all possible causes) are listed.

Under "Effects on the Driving Task" potential problems with driving are given; these focus upon specific motions, maneuvers, or instruments the student might have trouble mastering because of the symptom.

Under "Implications for Driver Education," adaptive devices and instructional strategies that might be required are listed. The numbers in this list correspond to the numbers in the "Effects on the Driving Task" list. This will help the instructor relate specific problems to potential solutions.

Indexes

The indexes in the back of this booklet provide cross references for causal conditions and for specific adaptive controls. The index of causal conditions will be useful when the instructor has a medical diagnosis (such as paraplegia) and wants to learn about symptoms that might affect driving. The index of adaptive controls and other devices will be useful in determining which students might use a particular device.

Contents

1. Left leg missing or nonfunctional
2. Right leg missing or nonfunctional
3. Both legs missing or nonfunctional
4. Short legs
5. Left arm amputated below elbow
6. Right arm amputated below elbow
7. Both arms amputated below elbow
8. Left arm missing above elbow or nonfunctional
9. Right arm missing above elbow or nonfunctional
10. Both arms missing above elbow or nonfunctional
11. Short arms
12. Lack of hand dexterity
13. Both arms and both legs disabled (quadriplegia)
14. Lack of range of motion: arms
15. Lack of range of motion: shoulders
16. Lack of range of motion: neck
17. Lack of range of motion: hips
18. Small body size
19. Lack of body balance
20. General muscle weakness
21. Poor muscle control
22. Poor endurance, fatigue
23. Lapses of consciousness

See indexes at the back of this booklet for cross references by causal conditions and by specific adaptive controls.

Left Leg Missing or Nonfunctional

1

Causes

amputation (surgical or accidental)
paralysis
- stroke (left hemiplegia)
- nerve injury
- multiple sclerosis
- polio

head trauma
birth defect

Effects On The Driving Task

1. Inability to use left foot on dimmer switch and parking brake.
2. Possible inability to maintain body balance (depending on height of amputation).
3. Inability to use clutch.
4. Possibility of leg or foot interfering with driving mechanisms.

Implications For Driver Education

1. Hand operated dimmer switch and parking brake (or parking brake mounted for right foot).
2. Shoulder- or chest-type safety belts; arm rests.
3. Automatic transmission.
4. Means of restraining disabled leg (belt, loop, or barrier of some type) to keep it from lodging against brake, or accelerator.

Both Legs Missing or Nonfunctional 3

Causes

amputation (surgical or accidental)
paralysis or paresis
- spinal cord injury
- polio
- multiple sclerosis

birth defect
cerebral palsy (lack of control or coordination)

Effects On The Driving Task

1. Inability to use brake and accelerator.
2. Inability to use dimmer switch or foot operated parking brake.
3. Possible difficulty maintaining body balance (depending on height of amputation or paralysis).
4. Possibility of legs interfering with driving controls.
5. Inability to use clutch.
6. Possible difficulty entering car.

Implications For Driver Education

1. Hand operated brake and accelerator.
2. Hand operated dimmer switch and parking brake.
3. Special seat structure, cushions, arm rests, or chest/shoulder safety belts.
4. Means of securing legs (e.g., belt, loop, or barrier) to keep them away from brake and accelerator.
5. Automatic transmission.
6. Assist bar or strap; transfer board. Swivel seat is also helpful.

Both Legs Missing or Nonfunctional (Continued) 3

Other Comments

- If loss of sensation is present, student may be unaware of dangers such as burns from heater or sun-heated seats, ankle turned in a position cutting off circulation, feet getting in the way of controls, and so on. The instructor should alert the student to these dangers.

- Loss of bowel and bladder control may be present with paraplegia and quadriplegia. While the student probably will be equipped to deal with this, accidents may occur. The instructor should be prepared to deal with potentially embarrassing situations.

Short Legs 4

Causes	Effects On The Driving Task
birth defect dwarfism	1. Inability to reach brake and accelerator. 2. Inability to operate dimmer switch and parking brake.

Implications For Driver Education

1. a. Extension on brake and accelerator pedals up to 2 inches. If more than 2-inch extension is needed, hand controls (as for BOTH LEGS MISSING OR NONFUNCTIONAL) might be more effective.
   b. Back cushion if needed.
2. Hand dimmer switch and parking brake.

Left Arm Amputated Below Elbow 5

Causes	Effects On The Driving Task
amputation due to injury or disease	1. Inability to grasp and turn regular steering wheel (if left arm was the dominant arm). 2. Inability to shift gears while steering. 3. Difficulty grasping and pulling any left-hand dash controls. (The driver will be able to push or pull any instrument that can be grasped.)

Implications For Driver Education

1. Driving ring attached to steering wheel, mounted left.
2. Automatic transmission is advisable.
3. Rings attached to any left-hand dash controls.

Right Arm Amputated Below Elbow

6

Causes	Effects On The Driving Task
amputation due to injury or disease	1. Difficulty grasping and turning regular steering wheel (if right arm was dominant or if both arms are affected). 2. Difficulty grasping and pulling right-hand dash controls. 3. Although the driver with a right-hand hook should be able to operate either a standard or an automatic shift lever, an automatic is easier.

Implications For Driver Education

1. Driving ring attached to steering wheel, right side.
2. Rings attached to right-hand dash controls.
3. Automatic transmission recommended.

Both Arms Amputated Below Elbow

7

Causes

amputation due to injury or disease

Effects On The Driving Task

1. Inability to grasp and turn regular steering wheel.
2. Difficulty grasping and pulling dashboard controls.
3. Difficulty grasping and pulling or turning other small devices or buttons in the car (door locks, window cranks, certain types of interior door handles, etc.).

Implications For Driver Education

1. Driving ring attached to steering wheel, on dominant-arm side.
2. Rings attached to dashboard controls.
3. Depending on the make of car, it may be helpful on the personal car to attach rings to any small devices (door locks, window cranks, interior door handles, ashtray, glove compartment, radio knobs, etc.) that the student finds difficult to operate.

Left Arm Missing Above Elbow or Nonfunctional 8

Causes

amputation (surgical or accidental)
nerve injury
stroke (left hemiplegia)
head trauma
birth defect
multiple sclerosis
joint stiffening from hemophilia

Effects On The Driving Task

1. Inability to perform hand-over-hand turn.
2. Inability to use left-hand turn signal lever.
3. Difficulty reaching any right-hand dash controls.
4. Inability to release left-hand parking brake.
5. Inability to shift gears on standard transmission while right arm is occupied.
6. Difficulty sounding horn while right hand occupied.

Implications For Driver Education

1. Steering knob or other device mounted right.
2. Turn signal lever — right-hand extension or electrical signal.
3. Right-hand extensions on any left-hand dash controls (or dashboard models with right-hand controls).
4. Parking brake release adapted for left foot or right hand.
5. Automatic transmission.
6. Horn ring reachable without letting go of steering knob.

Right Arm Missing Above Elbow or Nonfunctional 9

Causes

amputation (surgical or accidental)
nerve injury
stroke (right hemiplegia)
head trauma
birth defect
multiple sclerosis
joint stiffening from hemophilia

Effects On The Driving Task

1. Inability to perform hand-over-hand turn.
2. Inability to use right-hand shift lever.
3. Difficulty reaching right-hand dash controls (lights, wipers, etc.) while in motion.
4. Possible difficulty turning ignition key.
5. Inability to shift gears on standard transmission.
6. Difficulty sounding horn or operating turn signal while left hand is occupied.

Implications For Driver Education

1. Steering knob or other device mounted left.
2. Shift lever — left-hand extension.
3. Left-hand extensions for dash controls (and/or dashboard model with some left-hand controls).
4. Ignition key reachable with left hand while parked, or adapted for left hand.
5. Automatic transmission.
6. a. Horn ring reachable without letting go of steering knob.
   b. Electrical turn signal.

Both Arms Missing Above Elbow or Nonfunctional 10

Causes

amputation (surgical or accidental)
nerve injury
birth defect
multiple sclerosis

Effects On The Driving Task

1. Inability to use steering wheel.
2. Inability to operate standard transmission.
3. Inability to operate turn signal, ignition key, gear selector, dash controls, horn, parking brake release.

Implications For Driver Education

1. For steering: metal boot mounted on circular disk on floor board, left foot.
2. Automatic transmission.
3. a. Gear selector on floor, right foot.
   b. Horn and turn signal on floor.
   c. Ignition, lights, windshield wipers, and emergency brake underneath and behind instrument panel.

Short Arms

11

Causes	Effects On The Driving Task
birth defects dwarfism	1. Inability to reach dashboard controls and ignition. 2. Possible inability to reach shift lever and turn-signal lever. 3. Inability to use comfortably the steering wheel as conventionally placed. 4. Too many hand-over-hand maneuvers required to turn wheel.

Implications For Driver Education

1. a. Back cushion.
   b. Extensions for dash controls and ignition key.
2. Extensions on shift lever and turn signal lever, if necessary.
3. a. Extension of steering column to put steering wheel closer to driver.
   b. Adjustable steering wheel if possible.
4. Smaller steering wheel (requiring fewer revolutions to turn wheel).

Lack of Hand Dexterity

12

Causes

cerebral palsy
paraparesis
quadriparesis
multiple sclerosis
arthritis
stroke (left or right hemiplegia)
head trauma

Effects On The Driving Task

1. Limited ability to grasp and turn steering wheel.
2. Limited ability to grasp and operate ignition key and dash controls.
3. Possible inability to release hand brake.

Implications For Driver Education

1. Tri-post, "V," or cuff-type steering wheel spinner.
2. a. Rings or other adaptations on dash controls.
   b. Ignition key holder.
3. Foot operated parking brake.

Both Arms and Both Legs Disabled (Quadriplegia) 13

Causes	Effects On The Driving Task
spinal cord injury	1. Inability to use brake, accelerator, dimmer switch, foot-operated parking brake, and clutch. 2. Limited ability to grasp and turn steering wheel. 3. Limited ability to maintain body balance. 4. Possible limited ability to see full field of traffic. 5. Difficulty entering car and storing wheelchair. 6. Possible fatigue. 7. Difficulty using dash controls, ignition key, and seat belt fixtures.

Implications For Driver Education

1. a. Hand operated brake, accelerator, dimmer switch (may be combined with horn switch).
   b. Extension and loop on parking brake.
   c. Automatic transmission and parking brake.
2. "Quad" steering device ("V" shaped grip, semicircle, steering pin, or tri-post, as necessary); wrist cuff, wrist splint, or elbow support, as necessary.
3. Chest harness safety belt, arm rests, and cushions as necessary.
4. Side view mirrors and full-range rear view mirrors if neck rotation is limited.

Both Arms and Both Legs Disabled (Quadriplegia) (Continued)

5. a. Two-door car.
   b. Assist bar or strap, transfer board, and wheelchair hoist as necessary.
6. a. Instruction in avoiding and dealing with fatigue.
   b. Driving lessons planned with awareness of student's stamina range.
7. Ignition key holder and adaptations of seat belt fixtures and other small devices.

Other Comments

- If range of arm motion is a problem, a smaller diameter steering wheel may be indicated. Lever type controls (operated by the hand or head) are available for dash controls. Power equipment (seats, windows, wheelchair hoist, etc.) is helpful, as is an adjustable, telescopic steering wheel.
- If a loss of sensation is present, the student may be unaware of dangers such as burns from heater or sun-heated seats, an ankle turned in a position cutting off circulation, feet getting in the way of controls, and so on. The instructor should alert the student to these dangers.
- Loss of bowel and bladder control may be present with paraplegia and quadriplegia. While the student will probably be equipped to deal with this, accidents may occur. The instructor should be prepared to deal with potentially embarrassing situations.
- For some quadriplegics, a van which can be driven from the wheelchair may be the best choice in a personal vehicle.

Lack of Range of Motion: Arms

14

Causes

arthritis
contractures following severe burns
poor bone alignment following fractures
joint inflammation from hemophilia
birth defects
growth disorders
quadriplegia (see Card 13)

Effects On The Driving Task

1. Limited ability to turn steering wheel.
2. Possible difficulty operating dash controls, shift lever, turn signal, and parking brake release (depending on nature of limitation).

Implications For Driver Education

1. Extension of steering column and smaller diameter steering wheel with steering knob.
2. Extensions on or adaptations of dash controls, shift lever, turn signal, and parking brake release (as needed).

Lack of Range of Motion: Shoulders

15

Causes

arthritis
contractures following severe burns
poor bone alignment following fracture
joint inflammation from hemophilia
birth defects
growth disorders
quadriplegia (see Card 13)

Effects On The Driving Task

1. Difficulty or inability to turn steering wheel.
2. Possible difficulty or inability to operate dash controls, shift lever, ignition key, and parking brake release.
3. Limited ability to see fully the entire field of traffic.

Implications For Driver Education

1. a. Extension on steering wheel column and smaller diameter wheel with spinner knob, or
   b. Foot operated steering (See BOTH ARMS MISSING ABOVE ELBOW) if limitation is severe.
2. Extensions or adaptations of dash controls, shift lever, turn signal, and ignition switch, as needed, and foot operated parking brake.
3. Full-range rear view mirror and side mirrors.

Lack of Range of Motion: Neck

16

Causes

arthritis
neck injury
birth defects
growth disorders
dwarfism
contractures following severe burns
quadriplegia
joint inflammation from hemophilia
poor bone alignment following fracture

Effects On The Driving Task

1. Limited ability to see fully the entire field of traffic.

Implications For Driver Education

1. Convex or 48° rear view mirror and side view mirrors.

Lack of Range of Motion: Hips

17

Causes

arthritis
contractures following severe burns
poor bone alignment following fractures
joint inflammation from hemophilia
birth defects
growth disorders
paraplegia and quadriplegia (see Cards 3 and 13)

Effects On The Driving Task

1. Difficulty using brake and accelerator.
2. Difficulty using dimmer switch and parking brake.
3. Difficulty using clutch.
4. Possible difficulty turning to watch rear view while backing.
5. Possible difficulty entering and leaving car.

Implications For Driver Education

1. Hand operated brake and accelerator, if needed.
2. Hand operated dimmer switch and parking brake.
3. Automatic transmission.
4. Convex or 48° rear view mirror.
5. Assist bar or strap (swivel seats are also helpful).

Small Body Size

18

Causes

dwarfism
congenital smallness
other birth defects
growth disorders

Effects On The Driving Task

1. Insufficient height to see safely out windows.
2. Inability to reach brake, accelerator, dimmer switch, and parking brake.

If arms are short:

3. Inability to reach dash controls and ignition key.
4. Inability to use comfortably the steering wheel as conventionally placed.
5. Too many hand-over-hand maneuvers required to turn wheel.

Implications For Driver Education

1. Specially constructed seat to raise the driver enough to see out windows and over steering wheel.
2. Extensions on brake, accelerator, dimmer switch, and parking brake to put them within the driver's reach, or hand operated controls and a steering knob.
3. Extensions for dash controls and ignition.

Lack of Body Balance

19

Causes

spinal cord injury
- paraplegia
- paraparesis
- quadriplegia
- quadriparesis

multiple sclerosis

1. Danger of falling over in response to turn of the car or sudden motion.

Implications For Driver Education

1. Specially constructed seat for balance, arm rests, cushions, and/or shoulder or chest safety belts.

General Muscle Weakness

20

Causes

muscular dystrophy
multiple sclerosis
amyotrophic lateral sclerosis
Guillain-Barré
adrenal disorders
quadriparesis
cerebral palsy

Effects On The Driving Task

1. Difficulty turning steering wheel and applying pressure to brake and clutch.
2. Difficulty applying and releasing parking brake.

Implications For Driver Education

1. Power steering, power brakes, and automatic transmission.
2. Adaptation of parking brake (for the stronger limb).

Other Comments

Multiple sclerosis, amyotrophic lateral sclerosis, and muscular dystrophy are progressive diseases — that is, they become worse with time. Students who have these diseases should be instructed as to the availability of various types of assistive equipment for cars. This will help them to identify and obtain additional equipment when it is needed.

Poor Muscle Control

21

Causes

cerebral palsy
multiple sclerosis
spinal cord injury
epilepsy (periodic spasms if condition uncontrolled)
head trauma
stroke (left and right hemiplegia)

Effects On The Driving Task

1. Difficulty controlling steering wheel.
2. Uncontrolled involuntary movement, cramps, or spasms of rigidity may present too great a danger for driving.

Implications For Driver Education

1. Tri-post, "V," or cuff-type steering wheel spinner.
2. Potential for uncontrolled muscle activity that may be dangerous for driving should be evaluated before laboratory phase of driver education is undertaken. If spasms occur in legs only, and hand controls are used, legs can be secured close to seat.

Poor Endurance, Fatigue

22

Causes

pulmonary disease
cardiac disease
multiple sclerosis
muscular dystrophy
amyotrophic lateral sclerosis
spinal cord injury (quadriplegia, quadriparesis)

Effects On The Driving Task

1. Inability to drive for long periods of time without rest.

Implications For Driver Education

1. a. Instruction on the necessity for planning short trips with frequent rest stops.
   b. Driving lessons planned with awareness of student's stamina range; constant awareness of student's present fatigue factor.
   c. Power steering and power brakes.

Other Comments

A person with a pulmonary disease or condition might require oxygen equipment in the car with him or her at all times.

Lapses of Consciousness

23

Causes

epilepsy
diabetes
heart conditions
convulsive disorders
cerebral palsy

Effects On The Driving Task

1. If not controlled, this presents too great a risk for driving.

Implications For Driver Education

1. Lapses of consciousness must be controlled by medication before any laboratory driver education is undertaken. Medication that causes drowsiness can also cause great risk.

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From idea to reality . . .

In 1976, Ohio was one of six states to receive an Incentive Grant from the National Highway Traffic Safety Administration. Channeled through the Ohio Department of Transportation, a $212,000 grant was awarded to the Ohio Department of Education to bring an idea into reality — to establish a traffic safety education center.

Such a center has been instituted by the Ohio Department of Education at The Ohio State University under the auspices of The National Center for Research in Vocational Education. One of the major tasks of the Ohio Traffic Safety Education Center has been to assist in the final development of this curriculum guide.

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